AUTOMOTIVE INDUSTRIES

AUTOMOTIVE and AVIATION MANUFACTURING
ENGINEERING • PRODUCTION • MANAGEMENT

OCTOBER 15, 1955

NATIONAL METAL SHOW NUMBER

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Ford's Prestige Car—Continental Mark II
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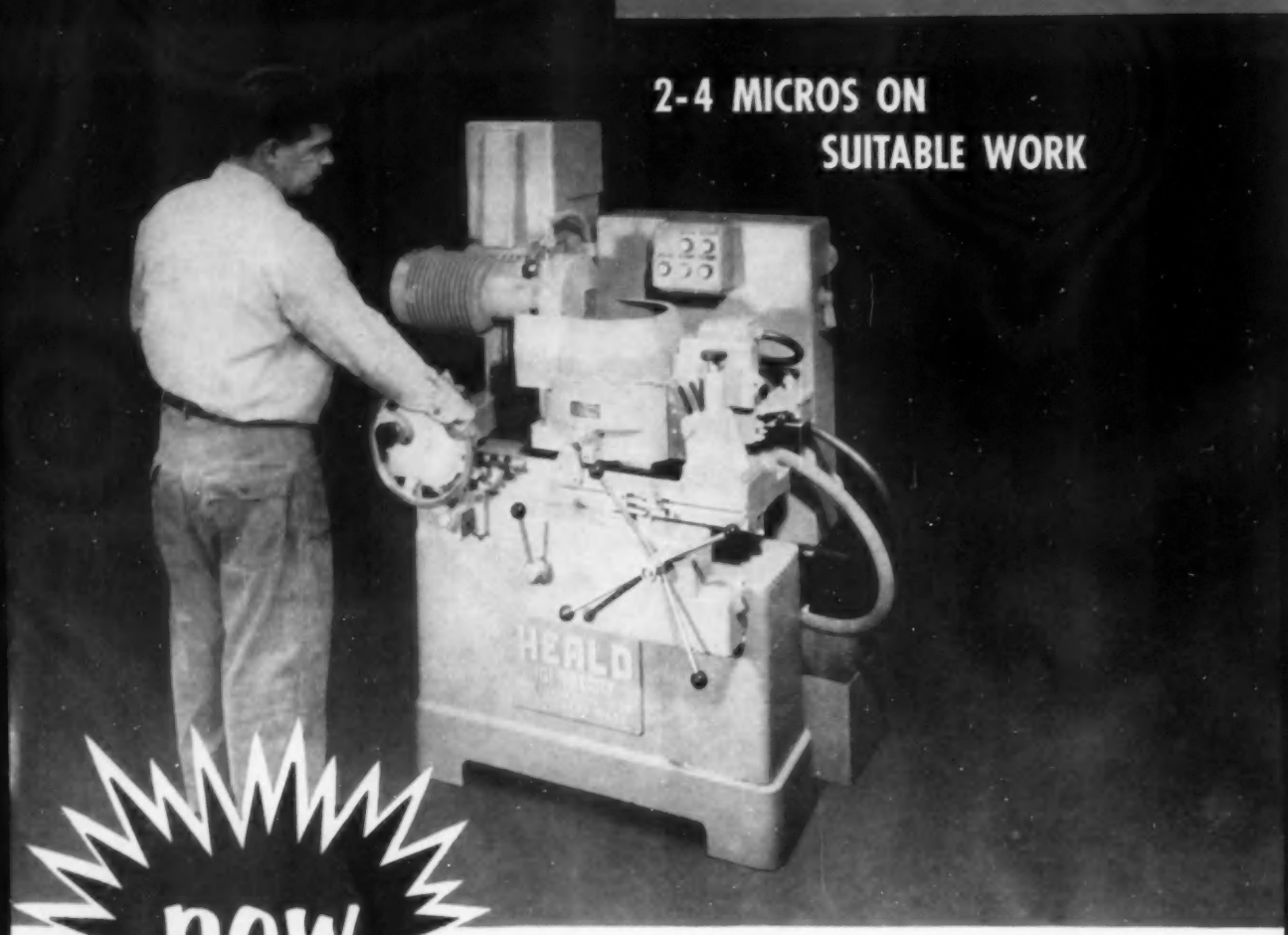

new

HEALD MODEL 161 ROTARY

provides new precision and economy for surface grinding SMALL PARTS

- Manual or Power Reciprocation
- Dry or Wet grinding
- Simple Mechanical Operation
- Grinds Flat, Convex or Concave
- Extremely Low Microinch Finish
- 6" Magnetic Chuck
- Extra Rigidity and Weight
- More Power to Wheelhead
- Column-Type Construction
- Moderate Cost

This completely new column-type Rotary is ideally suited to the general run of small surface grinding work – permitting greater accuracy and better finish than heretofore readily obtainable from equipment of this small size and moderate cost. On display at the Machine Tool Show, the Model 161 consistently turned out hardened steel gear cutters with concave faces ground to a 2-4 microinch finish.

Choice of manual or automatic power table reciprocation permits maximum operating efficiency on individual parts, small lots or long run jobs. Other outstanding features of this compact, versatile surface grinding machine are listed at the left. The bulletin mentioned below will give you the complete story.

Heald also offers two other sizes of high-precision, column-type Rotaries – the Model 261 for medium size work and the big, heavy-duty Model 361 for large work. Information will be gladly sent on request.

For profitable precision finishing on any type of work, IT PAYS TO COME TO HEALD!

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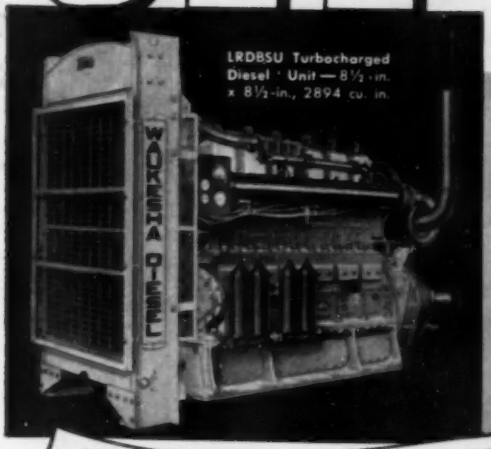

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UP TO 1135 HORSEPOWER

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293

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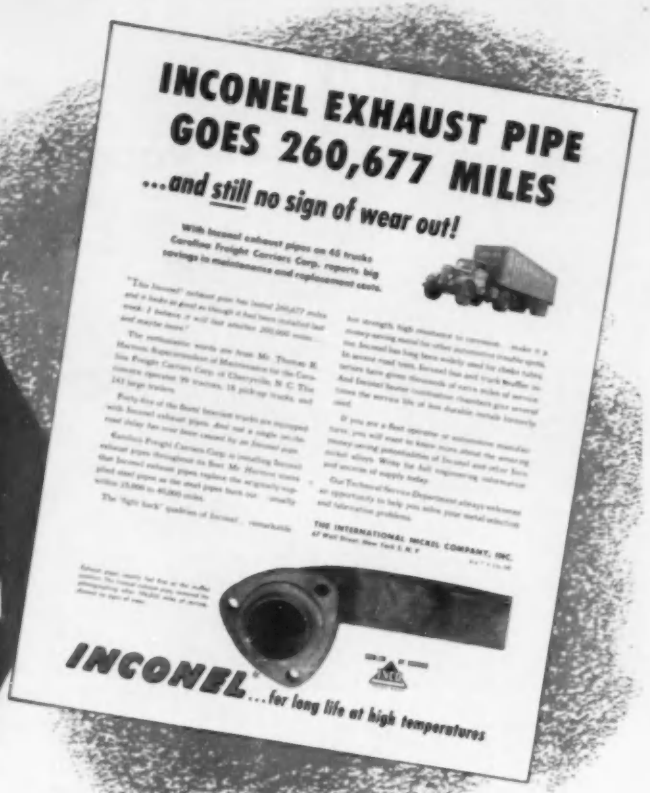
WAUKESHA MOTOR COMPANY, Waukesha, Wisconsin • New York • Tulsa • Los Angeles

Now it's 900,000 miles and still in excellent condition


INCONEL EXHAUST PIPE GOES 260,677 MILES
...and still no sign of wear out!
With Inconel exhaust pipes on 65 trucks Carolina Freight Carriers Corp. reports big savings in maintenance and replacement costs.
INCONEL ...for long life at high temperatures

It was back in 1949 that this advertisement was first published.

Even then, Mr. Tom Harmon, Superintendent of Maintenance for the Carolina Freight Carriers Corp. of Cherryville, N. C., was excited about the exhaust pipe life he was getting from Inconel®. It had already given at least four and a half times the life of carbon steel pipe and helped him make big savings in replacement and repair costs.

Now read what Mr. Harmon writes after his first Inconel exhaust pipe reached 900,000 miles of trouble-free service—*more than twenty times the life of steel pipe:*

"There are about 56 of these Inconel tubes in our service now. All are giving excellent service and have been given no repair work or service since installation—one exception, the first tube cracked at the weld (flange at tube) after over 300,000 miles. The flange was rewelded to tube and the exhaust pipe was put back on the tractor. The repaired exhaust pipe shows no damage after over 900,000 miles of operations.

"All Inconel exhaust pipes have between 800,000 and 900,000 miles. None show any signs of deterioration. They are in excellent condition and there is no doubt they will last the life of the tractors."

Whether you are a fleet operator or a manufacturer, this Inconel service-life story is important to you. It points out how you can count on Inconel wherever you need an alloy with excellent hot strength and resistance to heat and corrosion. And it shows that parts made of Inconel will pay for themselves many times over in reduced lay-up time and replacement costs.

You will find that other Inco Nickel Alloys can help you with many a problem where special characteristics are desired. Write Inco's Technical Service Section for aid.

THE INTERNATIONAL NICKEL COMPANY, INC.
67 Wall Street New York 5, N. Y.

INCO **INCONEL**... *for long life at high temperatures*

AUTOMOTIVE AI INDUSTRIES

A CHILTON MAGAZINE — PUBLISHED SEMI-MONTHLY

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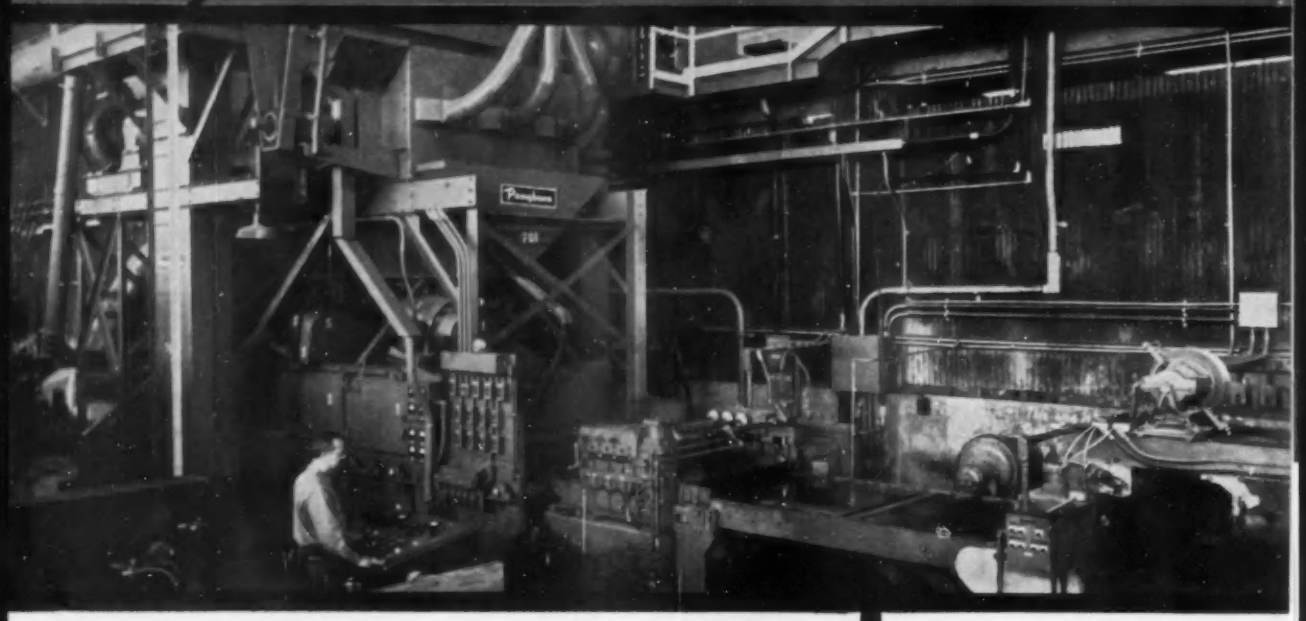
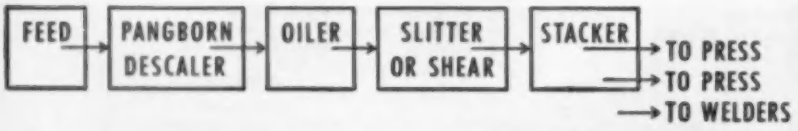
STEEL FABRICATORS!

NOW Pangborn offers you

Automation!



For fabricators using flat steel, coils, cut lengths—Pangborn Rotoblast® Descaling Machines offer *straight line* operation. One feed through descaler, oiler, slitter and stacker!



Here's How You Benefit!

- *You cut costs by using hot rolled unpickled steel.*
- *You speed production.*
- *You reduce labor costs.*
- *You eliminate problem of acid fumes and acid disposal.*
- *You use minimum floor space.*

For full details on automation for fabricators, write for Bulletin Number 224 to Pangborn Corporation, 3900 Pangborn Blvd., Hagerstown, Maryland.

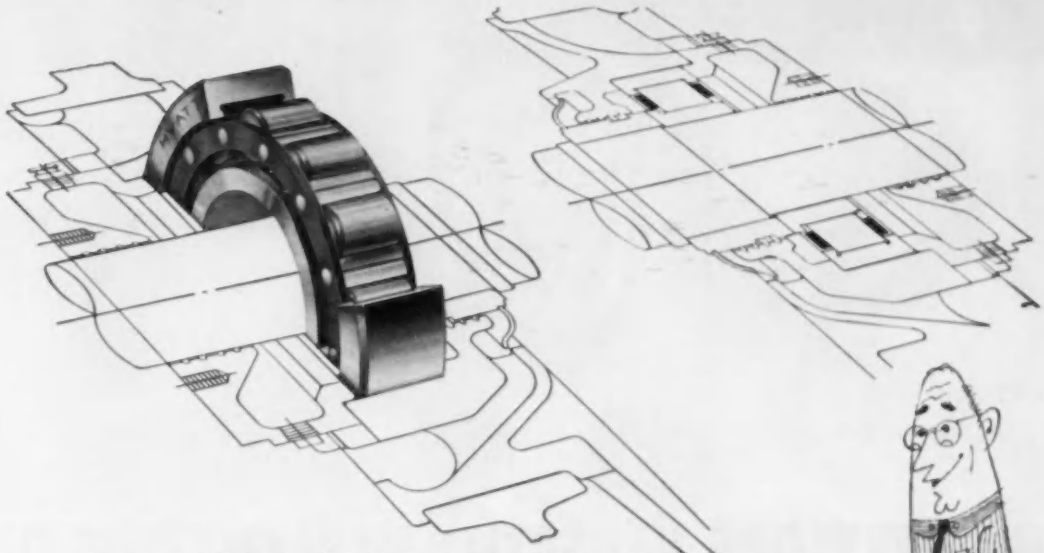
Manufacturers of Blast Cleaning and Dust Control Equipment.

Pangborn

BLAST CLEANS CHEAPER

How Hy-Loads can help you . . .

OVERCOME OVERLOADING



HY POTENUSE, the sage of the slide rule, says:

This HYATT Hy-Load is heading for a long hard life. It's been designed into as tough a job as you can hand any bearing—the armature shaft of a steel mill motor.

These HYATT Bearings must maintain the armature on centers with very close running clearance despite the fact that *steel mill motors are frequently overloaded and are regularly reversed under full load!*

But ability to "take it" isn't the only reason leading motor builders mount HYATTS on both ends of armature shafts: the offset of the flanged inner race provides vital *inbuilt, non-adjustable free end float*, permitting the armature to center itself electrically. What's more, HYATT'S *separable and interchangeable* races facilitate quick replacement of armatures.

See why so many smart designers agree? *You can't go awry when you specify—*

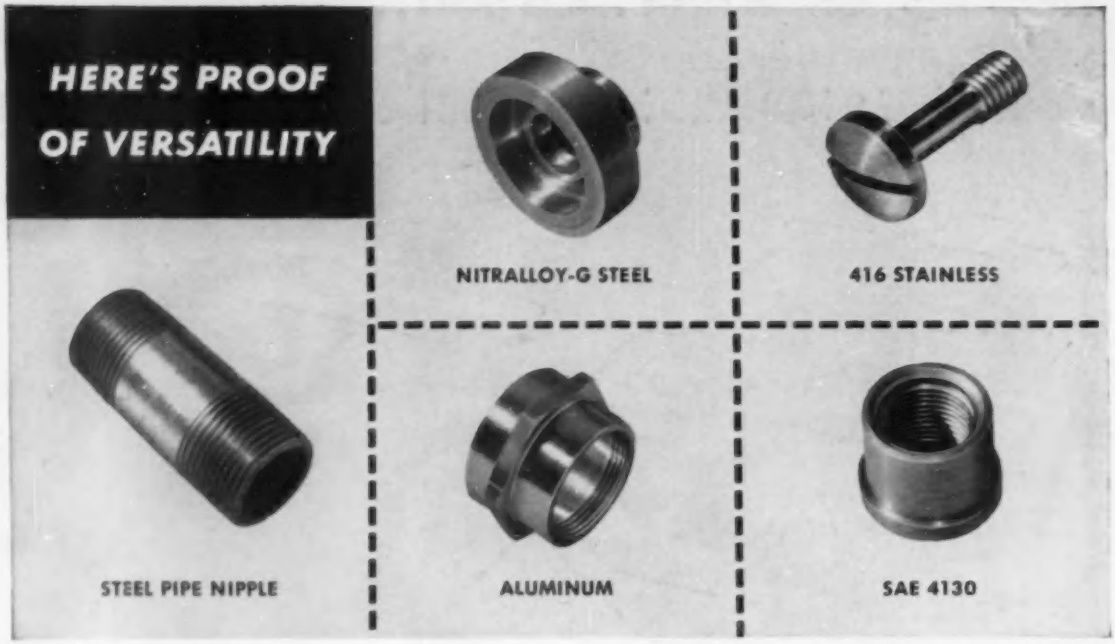
YOUR COMPLETE LINE
OF CYLINDRICAL ROLLER BEARINGS

HYATT

ROLLER BEARINGS

STRAIGHT BARREL TAPER

HYATT BEARINGS DIVISION • GENERAL MOTORS CORPORATION • HARRISON, NEW JERSEY



SUN DEVELOPS VERSATILE NEW CUTTING OIL FOR SCREW MACHINES AND JOB SHOPS

New cutting oil, Sunicut 5534, is moderately priced... gives excellent machining results on wide range of steels

New Sunicut 5534 is a non-emulsifying, transparent cutting oil specially compounded to give above-average machining results to operators who want a single oil to machine a large variety of ferrous metals.

Tests have proved that new Sunicut 5534 meets this demand for an all-purpose cutting oil. It is ideal for general screw machine and turret lathe work. It is also excellent for tapping, drilling, threading, and light stamping operations. In addition, new Sunicut 5534 can be used on many special machining jobs, both high and low speed, with metals ranging from B1112 to 4130 as well as free-machining stainless steels.

For complete information about new Sunicut 5534 and how it can help you reduce your oil inventories... lower your production costs... see your Sun representative. Or write SUN OIL COMPANY, Phila. 3, Pa., Dept. AA-10.

SUNOCO®

INDUSTRIAL PRODUCTS DEPARTMENT

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IN CANADA: SUN OIL COMPANY, LTD., TORONTO AND MONTREAL

Improved Dual Sealing... with Single Seal Economy

New 2-lip design with more effective sealing surfaces makes this the modern replacement specification for compound element seals . . . giving increased sealing efficiency at minimum cost . . . and more compact seal housing.

Made in two types, both with oil-, age-, and heat-resisting Victoprene synthetic rubber elements. Exclusive Victor mechanical and chemical bonding of element and metal case assures permanent single-unit structure.

One-piece Victoprene Type K4 and K6 Oil Seals

TYPE K4 FEATURES

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2. Valley between sealing lips retains initial lubricant for minimum friction and longer sealing life.
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4. Available with or without Victoprene rubber on O.D.
5. Available with or without garter spring on primary sealing element.
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Type K6... without Victoprene on O.D.

For installations not requiring Victoprene on outer periphery and outside face of seal. Otherwise, design of 2-lip sealing element and unitary molded construction are identical with that of Type K4.

Complete information on K4 and K6 seals supplied through your Victor Field Engineer, or on request to the factory. Victor Mfg. & Gasket Co., P.O. Box 1333, Chicago 90, Ill.

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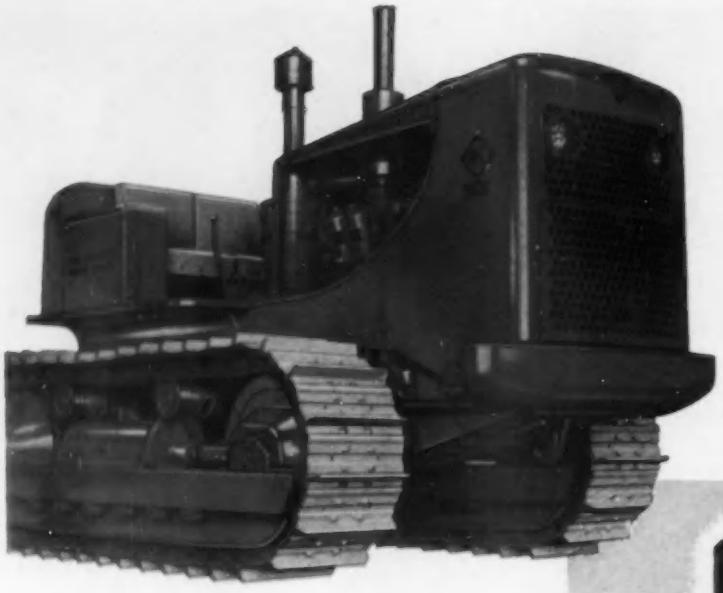
VICTOR

Victoprene Oil Seals

SEALING PRODUCTS EXCLUSIVELY



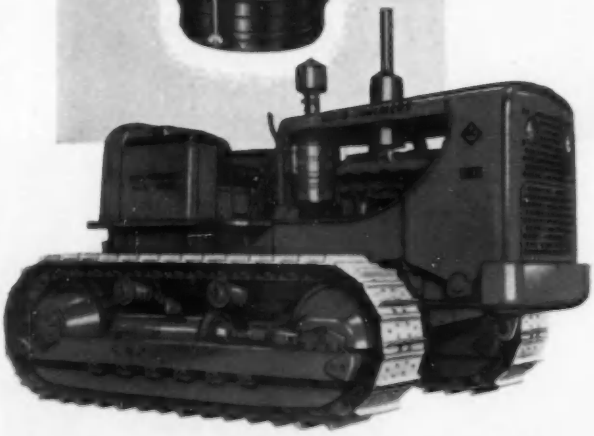
DIRT STOPPERS FOR DIRT MOVERS

United Air Cleaner Protects New Allis-Chalmers Tractors

These two new Allis-Chalmers tractors can move dirt more effectively because both are safeguarded against engine-damaging dust and dirt — they are protected by United Oil Bath Air Cleaners.

Even under the dustiest earth-moving work conditions, only clean, abrasive-free air enters the combustion chambers of the powerful new Allis-Chalmers diesel engines. The protection furnished by the United Oil Bath Air Cleaner adds hundreds of hours to the life of engine parts.

Whatever the engine—heavy-duty diesel or gasoline for tractors or trucks, passenger car engines, or small portable power units, United has an air cleaner —or can build one—to meet your needs. We invite your inquiry.



Allis-Chalmers new diesel crawler tractors

(Above) 31,500 lb Model HD-16
(At Right) 20,500 lb Model HD-11

UNITED SPECIALTIES COMPANY

United Air Cleaner Division — Chicago 28
Mitchell Division — Philadelphia 36; Birmingham 11, Ala.

AIR CLEANERS ★ METAL STAMPINGS ★ ROLLED SHAPES
IGNITION AND TURN SIGNAL SWITCHES ★ DOVETAILS

Why GISHOLT BALANCING stresses "plane separation"

Take this typical part: when you rotate it at high speed, any unbalance effect at one point—or plane—has a "cross effect" in another. If you don't have proper means for separating these unbalance effects in two correction planes, then your balancing job becomes a tedious, time-wasting job of trial and error. And you're never quite sure.

Gisholt Balancers provide plane separation by means of electrical networks. They enable you to use whatever correction planes are most convenient on your specific parts. They let you measure unbalance directly in correction units. They give you the most sensitive, accurate means ever devised—capable of measuring vibratory movement of at least .000025 inch. Gisholts are faster, easier to operate, easier to read. And they make it easy for you to be *sure*.

To have less than these advantages is to add to your costs in other ways—in time, loss of accuracy and inferior balancing standards. Ask us to send the Gisholt Balancing Catalog.

GISHOLT MACHINE COMPANY
Madison 10, Wisconsin

DYNETRIC BALANCERS

TURRET LATHES · AUTOMATIC LATHES · SUPERFINISHERS · BALANCERS · SPECIAL MACHINES

Precision temperature control of the three Lindberg-Fisher furnaces is maintained through these conveniently grouped panels.

From left to right, Robert W. Scott, Virgil L. Shoemaker and Del T. Kay, general partners, SKS Die Casting Company.

"Outstanding Improvement"

IN CASTING METHODS WITH LINDBERG-FISHER INDUCTION FURNACES

● SKS Die Casting Company, Berkeley, California, is engaged in critical close dimensional work in casting fuel cell fittings for aircraft. To achieve consistent results extremely close control of metal temperature is essential.

Mr. Del T. Kay, SKS general partner, says: "We had no previous experience in induction melting and holding and sought the best advice we could find. As a result, we have installed three Lindberg-Fisher two-chamber Induction Melting Furnaces. These fulfilled our requirements completely and represented an *outstanding improvement* over our previous methods."

Like SKS, you will also find that Lindberg-Fisher Induction Melting and Holding Furnaces provide these advantages: cleaner molten metal, continuous production, cooler operation and minimum maintenance. Ask us to recommend the proper type of furnace for your particular needs or write for our Bulletin 560.

LINDBERG-FISHER MELTING FURNACES

LINDBERG ENGINEERING COMPANY, 2491 WEST HUBBARD STREET, CHICAGO 12, ILLINOIS

moraine engineering

...where problems inspire progress

Every engineer has watched a good idea thrown away because of seemingly insurmountable production problems. But that is something that seldom happens at Moraine.

If everyday methods won't solve a problem, Moraine engineers approach it from different directions, or try whole new methods, until the solution is reached. Continuing progress by design and process engineers has made Moraine a dependable, farsighted supplier to the automotive and other industries.

There are many ways to illustrate the basic Moraine philosophy . . . that success is assured to those whose experience and forward thinking help customers to anticipate their needs. One is pictured above: A new, greatly improved band assembly for the 1955 model of the biggest-production automatic transmission.

Other Moraine products include: Moraine-400 bearings, toughest automotive engine bearings ever made —M-100 engine bearings and Moraine conventional engine bearings—self-lubricating bearings—Moraine friction materials—Moraine metal powder parts—Moraine porous metal parts—Moraine power brakes —Delco hydraulic brake fluids—Delco brake assemblies, master cylinders, wheel cylinders and parts.

moraine products
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Purolator's "SELECTIVE" FILTRATION leaves additives in

Beneficial additives stay in as HD and heat-resistant lube oils pass through the Micronic* element of a Purolator filter . . . even though the element is straining out sludge, water and impurities as small as one micron (.000039-inch).

It's one of the reasons why original equipment manufacturers in the automotive field use more Purolators than any other make of filter. Besides this "selective" filtration, the accordion-pleated Micronic* element provides ten times the area of older types, making possible:

- ***High flow rates with minimum pressure drop.*** **Purolators themselves can be small . . . yet operate with pumps of standard size.**
- ***Maximum dirt storage capacity . . .*** **for long, efficient service life before replacement.**

*Registered Trade Mark

Micronic elements do not channel. They are waterproof and warp-proof and remain unaffected by engine temperatures. There's a Purolator to fit every vehicle, tractor and other gasoline- or diesel-engine-powered unit in service today. Write for our automotive catalog, No. 2054, to Purolator Products, Inc., Rahway, N. J., Dept. AI-1016.

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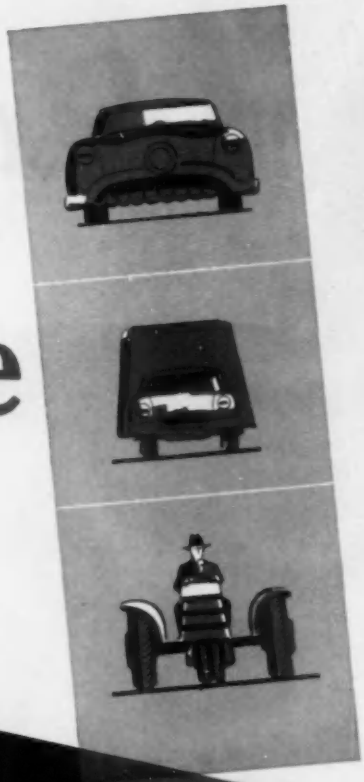

for modern cars, trucks and tractors

"No Kick-Out" feature combines new starting efficiency with proven economy

• Higher compression ratios, lighter flywheels and other advancements in modern engines have long pointed up the need of a starter drive that would follow through the weak explosions until the engine actually runs on its own power.

That's why vehicle manufacturers are turning in ever increasing numbers to the Bendix* Folo-Thru Drive as the solution to quicker and more dependable starting even under most adverse conditions.

This preference for the Bendix Folo-Thru Drive on modern vehicles is a most logical one, for Bendix Drives have always been the industry's choice as the most economical and efficient starting equipment.

*REG. U. S. PAT. OFF.

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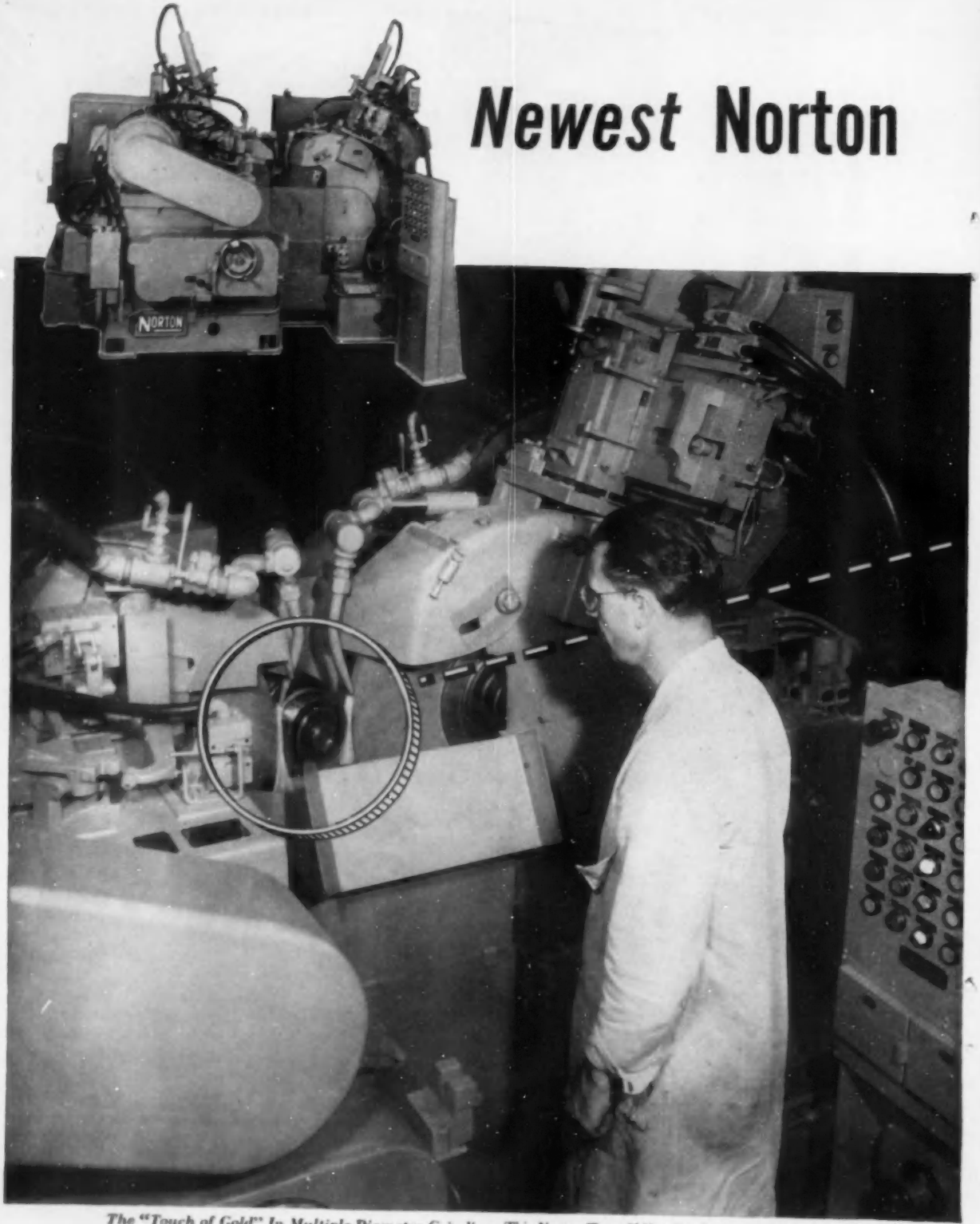
Bendix folo-thru starter drive

costs less. *Like the more than 95,000,000 Bendix* Starter Drives manufactured for the industry, the new Folo-Thru Drive requires no actuating linkage and the solenoid may be placed in any convenient position. Result is lower installation costs and no adjustments. Complete detailed information is available on request.*

Bendix* Folo-Thru Starter Drive | Bendix* Automotive Electric Fuel Pump | Stromberg* Carburetor

Newest Norton



The "Touch of Gold" In Multiple Diameter Grinding. This Norton Type CMS-1 Semiautomatic Multi-Wheelslide Cylindrical Grinder is set up to grind two conical surfaces simultaneously in automatically controlled plunge grinds. The wheelslides, opposed here, may be positioned in-line if the job requires.

grinder for multiple diameters

The Type CMS-1 Semiautomatic Multi-Wheelslide Grinder handles jobs impossible on ordinary multi-wheel machines

Here's a brand new Norton grinder with a special capacity for high production, low cost grinding of multiple diameter work.

The Type CMS-1 Semiautomatic Multi-Wheelslide Cylindrical Grinding Machine cuts production time and expense in a number of different ways. It grinds with top speed and accuracy. It reduces grinding wheel costs. Most importantly, it eliminates the need for separate grinds on separate machines.

Advanced Multi-Wheelslide Arrangement

During building, the Type CMS-1's sturdy, unitized wheelslides are positioned — opposed or in line — for specific job requirements. In use, slight angular or lateral adjustments may be made when setting-up. Each wheelslide mounts one or more 30" grinding wheels, with the type of work-holding equipment depending on the job. Slides operate in unison during production, but may be individually controlled for set up.

Other Outstanding Features

- Central, one-lever control of the automatic grinding cycle — plus automatic, electrically timed termination of the cycle — for greatly simplified operation.
- Two-rate automatic feed assures ideal conditions for rapid stock removal, with highest accuracy and finish.
- Convenient wheel feed hand wheels have "click-count" indexing, permitting feed adjustments in increments of "tenths." This simplifies size control in setting-up and in initial operation.
- Individual push-button-operated jogging control of wheelslides aid production by simplifying size control.
- Automatic wheel guard type truing devices operate consistently at predetermined speed and feed. Control of the amount of abrasive removed is close and uniform, with compensation of wheelslide setting for wheel diameter reduction. Results are most efficient, effortless truing, with reduced wheel cost per piece ground.

Get All The Facts

on the new Type CMS-1 grinder from your Norton Representative. Learn how you can improve your competitive position by replacing two or more old grinders with this ultra-modern machine. Or write direct to us for the whole story. And remember: only Norton offers you such long experience in both grinding machines and wheels to bring you the "Touch of Gold" that helps you produce more at lower cost. NORTON COMPANY, Machine Division, Worcester 6, Massachusetts.

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GRINDERS and LAPPERS

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SNYDER SEGMENTED AUTOMATION in 91 station, 182 operation, in-line transfer machine features four segments which can operate independently or as a unit to assure continuous production of automotive automatic transmission cases at 100 cases an hour at 80% efficiency

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TOOL & ENGINEERING COMPANY
3400 E. LAFAYETTE, DETROIT 7, MICHIGAN

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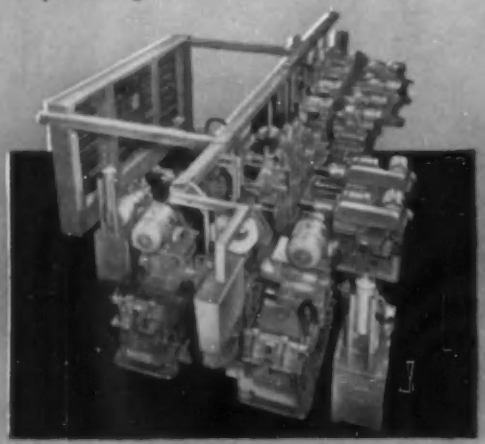
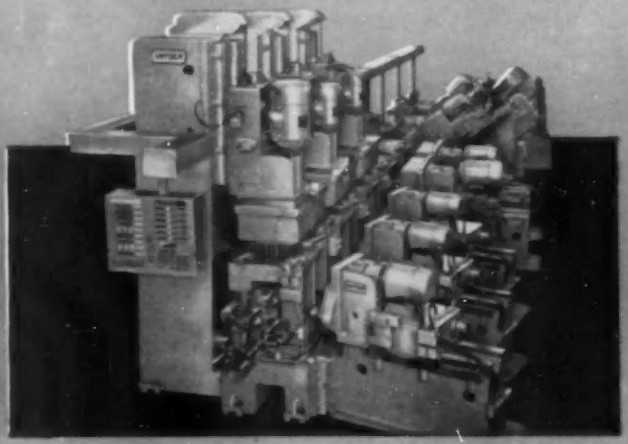
SEGMENT 1: 40 feet long, 19 stations, 10 spindles. Part manually loaded, both ends face milled, counterbored, three diameters rough and finish bored and faced, two pads side milled, pump pad face milled, clearance slot milled. Part tilted 90 degrees in processing.

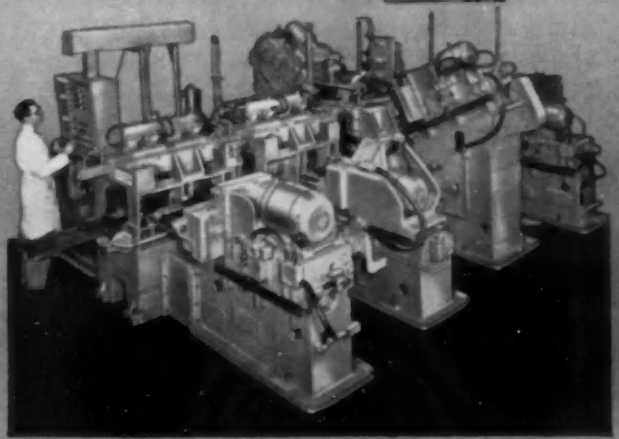


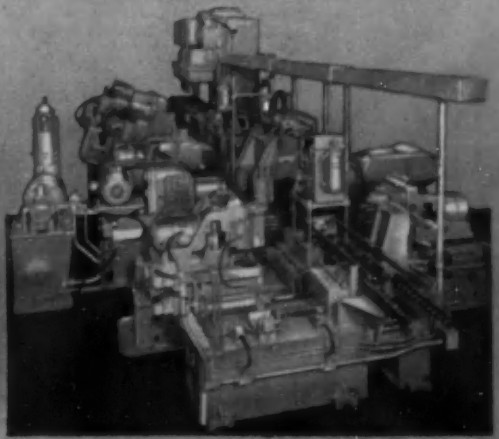
SEGMENT 2: 47 feet long, 31 stations, 91 spindles. In top face, end and at angular locations inside, 51 holes are drilled, countersunk, semi-finish and finish reamed, spotfaced, tapped. Part is tilted 90 degrees and rotated.



SEGMENT 3: 26 feet long, 17 stations, 21 spindles. Various drilling, chamfering, tapping, counterboring, reaming, spotfacing operations in both case sides. Part removed from transfer bar to special fixture and tipped 45 degrees to process angular inside hole, returned to transfer bar, turned 90 degrees, tilted 90 degrees to bring pump face up.

SEGMENT 4: 36 feet long, 24 stations, 60 spindles. Various drilling, chamfering, tapping, semi-finish boring and facing operations.





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ACTION PICTURE

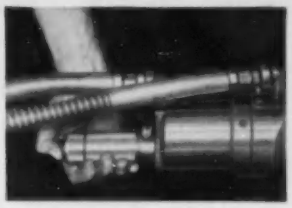
of how to save money by riveting!

This action photo, taken on the frame assembly line in one of the largest auto factories, illustrates how cost-conscious manufacturers save money with Hannifin "Hy-Power" Hydraulic Riveters.

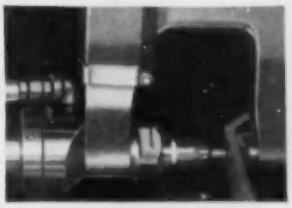
First step in assembly is to rivet the frame together... with Hannifin "Hy-Power" Riveters. The light-weight forged C-Frames hang from balancers within easy reach of each operator. No special skill is required to head the ⅜" rivets, cold, each in seconds. What's more, this "silent squeeze" method forms stronger, more uniform rivets, hot or cold.

Power source is the Hannifin "Hy-Power" Hydraulic Pressure Generator which quietly supplies pressure to the "Hy-Power" Cylinder that does the work. These riveters are available in 7½, 10, 12½, 17½, 25, 35, 50, 75 and 100-ton capacities.

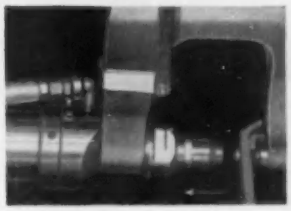
here's the HANNIFIN "HY-POWER" WORK CYCLE



In position. A single control button starts (or interrupts) the automatic Hy-Power cycle.



Ram approaches fast, then hydraulic pressure automatically intensifies, and the rivet head is formed.



Fast, automatic return. Total elapsed time to head a rivet is only 2 to 3 seconds.

"HY-POWER" CAN ALSO BE USED IN MULTIPLE TO SET SEVERAL RIVETS

Bulletin 150 tells how to save money on riveting, staking, punching, forming and bending operations. Write for copy.

do ALL you can do... with

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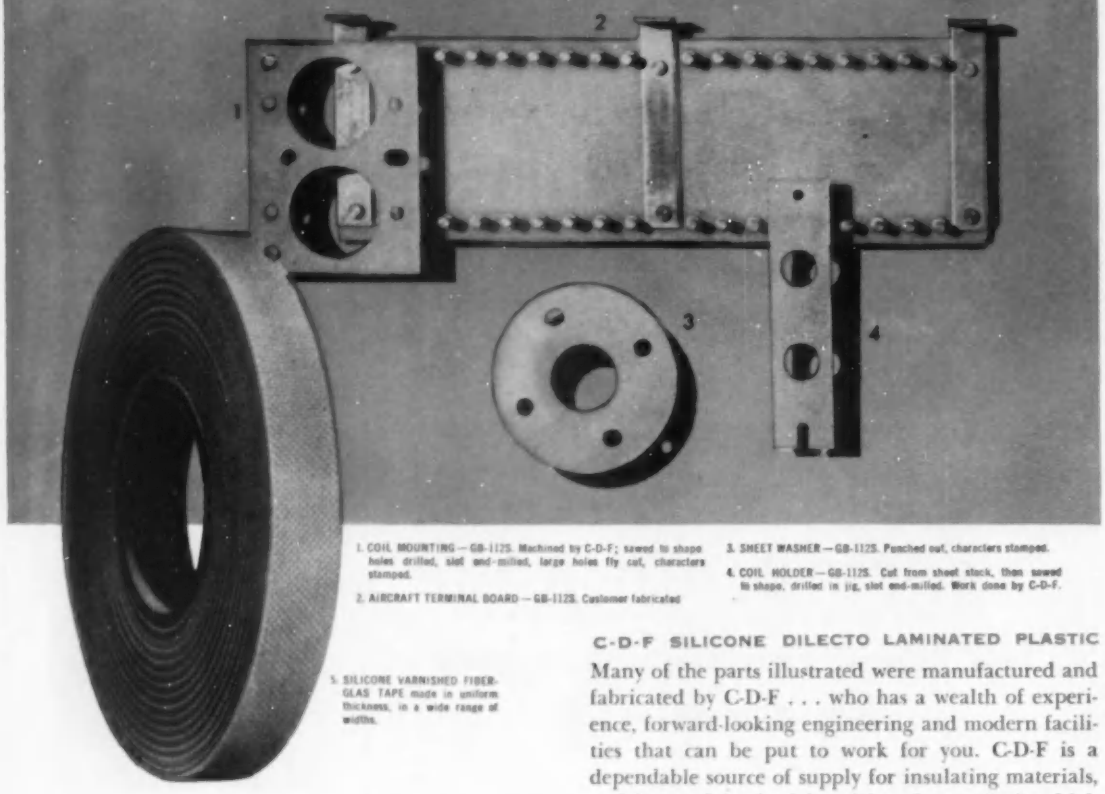
Air and Hydraulic Cylinders • Hydraulic Presses • Pneumatic Presses • "Hy-Power" Hydraulics • Air Control Valves

C-D-F SILICONES

For high temperature electrical insulation



1. COIL MOUNTING — GB-112S. Machined by C-D-F; sawed to shape holes drilled, slot end-milled, large holes fly cut, characters stamped.
2. AIRCRAFT TERMINAL BOARD — GB-112S. Customer fabricated
3. SHEET WASHER — GB-112S. Punched out, characters stamped.
4. COIL HOLDER — GB-112S. Cut from sheet stock, then sawed to shape, drilled in jig, slot end-milled. Work done by C-D-F.
5. SILICONE VARNISHED FIBERGLAS TAPE made in uniform thickness, in a wide range of widths.

C-D-F SILICONE TAPES are recommended for Class H insulation. It's been proved that silicone insulation has 10 times longer life than Class B insulation, even at the temperature limits of Class H. There are two types of C-D-F Silicone Tapes and Sheets: (1) Silicone varnished fiberglas; (2) Silicone rubber fiberglas. Each has the following properties:

- High temperature resistance
- High dielectric strength
- Low dielectric loss
- Resistance to moisture
- High tensile strength
- Flexibility

Both grades meet A.I.E.E. Standard for Class H insulation. They resist mild alkalis, non-oxidizing acids, mineral oils, oxygenated solvents. Silicone rubber fiberglas is recommended for many applications requiring a flexible abrasion-resistant material with good thermal conductivity. C-D-F Silicone tapes and sheets are available in a wide range of sizes in continuous rolls. For complete details, write for Technical Bulletin #47.

C-D-F SILICONE DILECTO LAMINATED PLASTIC

Many of the parts illustrated were manufactured and fabricated by C-D-F . . . who has a wealth of experience, forward-looking engineering and modern facilities that can be put to work for you. C-D-F is a dependable source of supply for insulating materials, and is noted for its fair pricing, for producing high quality products on schedule. Why not call in a C-D-F sales engineer on your problem. Or, write for Technical Bulletins:

#25—complete data on GB-261S, a fiberglas silicone laminate made of a staple filament woven fiberglas cloth and silicone resin in sheet form; #37—covers glass base silicone metal clad laminates; #42—post-forming grade of glass base silicone in sheet form; #23—GB-112S, fine weave continuous filament woven fiberglas with silicone resin, sheets, tubes, rods, molded shapes.

See our general catalog in Sweet's Design File for more data, the address and telephone number of your nearest C-D-F sales engineer. Also, write for technical bulletin and specific catalog, free test samples, or send us your print for quotation.

C-D-F *Continental-Diamond Fibre*

CONTINENTAL-DIAMOND FIBRE DIVISION OF THE BUDD COMPANY, INC.
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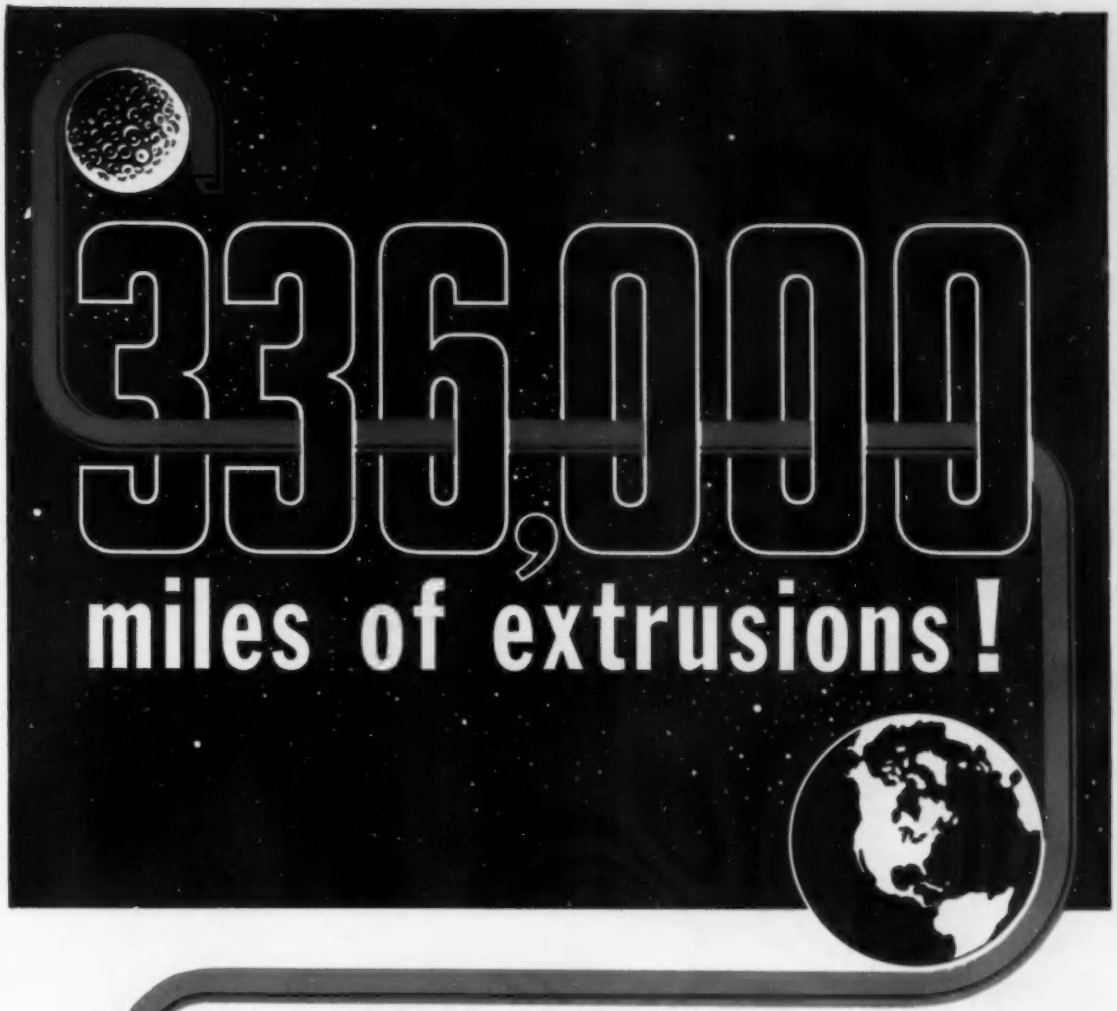


Our extruders have turned out enough plastic and rubber extrusions to reach to the moon and halfway back. In compiling this vast experience General Tire's Industrial Products Division has supplied thousands of original equipment manufacturers with just about every known type of extrusion. No job is too large, too small or too complicated for our design and production staff. Perhaps *you* can benefit from the fantastic extrusion mileage we've accumulated down through the years.

For literature or further information write to The General Tire & Rubber Company, Wabash, Indiana, Department D

THE GENERAL TIRE

Industrial Products Division

WABASH INDIANA

"From Plans to Products in Plastics and Rubber"

New Dorsey Model HTS low-bed trailer, loaded with heavy tractor and blade. This model, built largely with Mayari R low-alloy, high-strength steel, has a gooseneck ramp especially engineered to facilitate loading of long equipment such as motor graders without increasing trailer length.

To save weight yet hold strength, Mayari R was used for gooseneck, main beams and rear center outriggers. Weight reduction amounted to about 20 pct.

20 pct deadweight reduction for new Dorsey trailers

Down in Elba, Alabama, the Dorsey people are building a fine new line of heavy-duty, low-bed trailers in the 15- to 35-ton capacity range. These trailers have a reduced weight which enables them to carry more without exceeding legal highway limitations.

To make possible a trailer of minimum deadweight yet maximum strength, Dorsey chose Mayari R high-strength, low-alloy steel for most of the structural members, such as gooseneck, main beams, outriggers. Extensive testing convinced them that Mayari R could provide not only a 20 pct reduction in deadweight, but also additional impact-resistance and fatigue strength.

This kind of result is making sense to more and more designers of automotive vehicles. Result: more and more buses, trailers, trucks and delivery vans built of Mayari R. Many of these applications are described and illustrated in our Catalog 353, which also carries a lot of helpful technical information. A phone call or note to our nearest office will bring a copy to you promptly.

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. Export Distributor: Bethlehem Steel Export Corporation

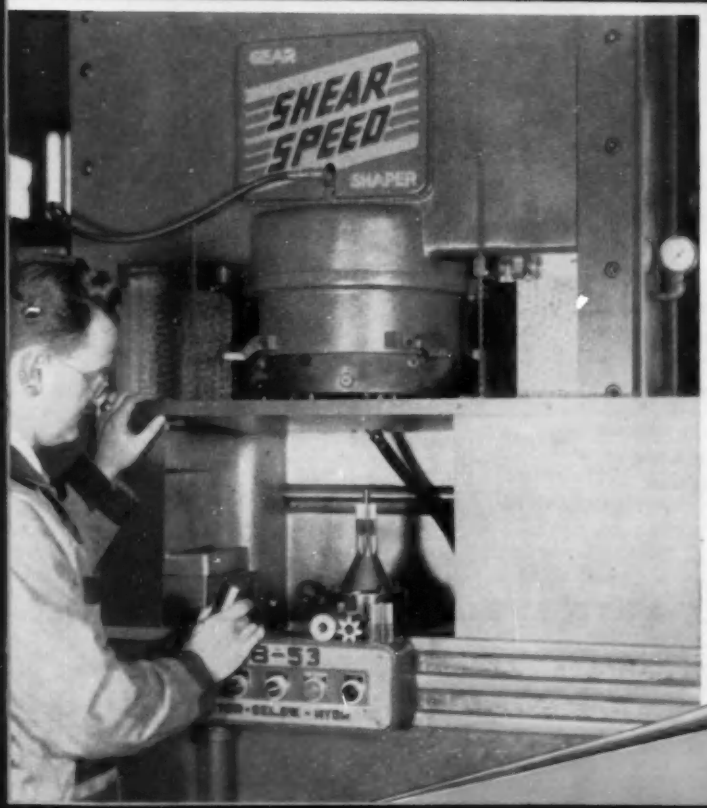
BETHLEHEM STEEL

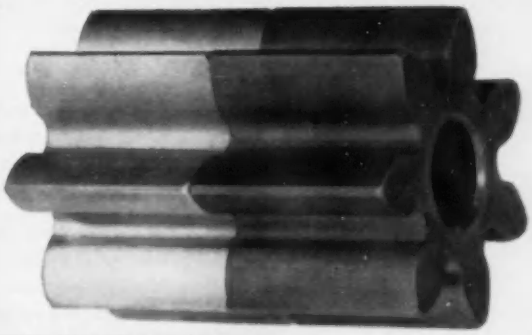
Mayari R makes it lighter... stronger... longer lasting

This Month's

GEAR PIX

RECORD SETTERS are these Shear-Speed gear shapers shown in final stage of assembly. More and more of these machines that cut all teeth simultaneously in a gear or similar toothed part are helping to set today's production pace.





CAST BLANK ON BOTTOM, steel blank on top, eliminates burrs when all teeth on both gears are cut simultaneously on Shear-Speed gear shapers. These mating automotive oil pump gears operate more smoothly due to close tolerances, smooth surface finishes, and perfectly formed 0.080-inch radii at the tooth fillets with no scallops or ridges. Three Shear-Speed gear shapers produce these gears for one of the best known automobiles.

MICHIGAN TOOL COMPANY

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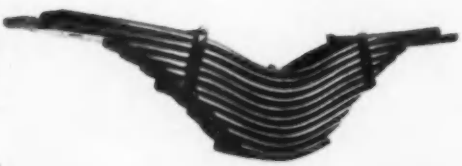
-where loads are REALLY HEAVY!

MACK trucks include some of the largest in the industry . . . designed to carry tremendous loads which impose heavy responsibilities on every structural member . . . body . . . frame . . . chassis . . . and especially the springs.

As one of the suppliers of springs for Mack trucks, BURTON has proved equal to the extreme requirements of these famous heavy duty vehicles. Here, the highest degree of dependability is an essential quality . . . for the performance of the springs profoundly influences that of the entire vehicle.



You are invited to follow the example of America's foremost truck and trailer manufacturers by bringing your spring requirements to the attention of Burton's engineering staff.

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AUTOMOTIVE ENGINEERING NEWS

PROPERTY AND APPLICATION DATA ON THESE VERSATILE ENGINEERING MATERIALS: "ZYTEL," "ALATHON," "TEFLON," "LUCITE."

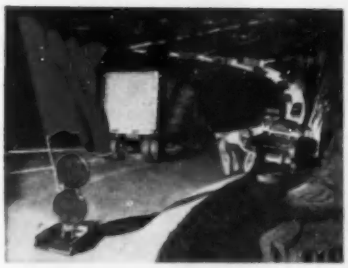
ZYTEL® makes ideal bearing and indicator for transmission selector

A molded part of Du Pont "Zytel" serves as indicator, bearing and damper for the transmission selector lever on 1955 Chrysler Corporation cars. (This part is molded for the Chrysler Corporation by Electric Auto-Lite Co., Bay City, Michigan.)

When Chrysler designers located the gear selector on the dashboard of the 1955 models, the indicator took on the additional duties of a bearing and damper for the selector lever. Its prominent place on the dashboard demanded an attractive material as well as a durable one. Du Pont "Zytel" nylon resin met the test in every way.

"Zytel" is strong and stiff, even in thin sections. A high hardness value, together with a low coefficient of friction, contributes to its excellent abrasion resistance. Parts molded of "Zytel" can be rapidly and inexpensively injection-molded. "Zytel" has good insulating qualities and is unaffected by most ordinary solvents and chemicals.

The uses of "Zytel" in the automotive field are many and varied. Many key parts have been fashioned from this versatile material. It may answer one of your designing needs. To get full details on this adaptable Du Pont engineering material, clip the coupon below.



Safety by LUCITE® for highway travelers at night

"Lucite" acrylic resin—which has so many automotive uses—now helps eliminate *"sitting ducks"*—cars or trucks stalled on the highway which can't warn oncoming vehicles of their predicament. The Vari-Flare contains lenses injection-molded of "Lucite." They can be seen a half mile or more. "Lucite" is dimensionally stable, resists crazing and breakage, and retains its superior optical properties. Sunlight and extremes of weather do not affect parts molded or extruded of "Lucite." *(Manufactured by Vari-Products Company, Chicago, Illinois. Lenses molded by Stimsonite Division of the Elastic Stop Nut Corporation of America, Chicago, Illinois.)*

NEED MORE INFORMATION?

If you would like further information about the properties and uses of "Zytel" and "Lucite" as automotive design materials, fill out and mail the coupon.

E. I. du Pont de Nemours & Co. (Inc.), Polychemicals Department
Room 1710, Du Pont Building, Wilmington 98, Delaware
In Canada: Du Pont Company of Canada Limited, P. O. Box 660, Montreal, Quebec

Please send me more information on the Du Pont engineering materials checked: ☐ "Zytel"* nylon resin; ☐ "Lucite"* acrylic resin; ☐ "Teflon"* tetrafluoroethylene resin; ☐ "Alathon"* polyethylene resin. I am interested in evaluating these materials for _____

NAME _____

POSITION _____

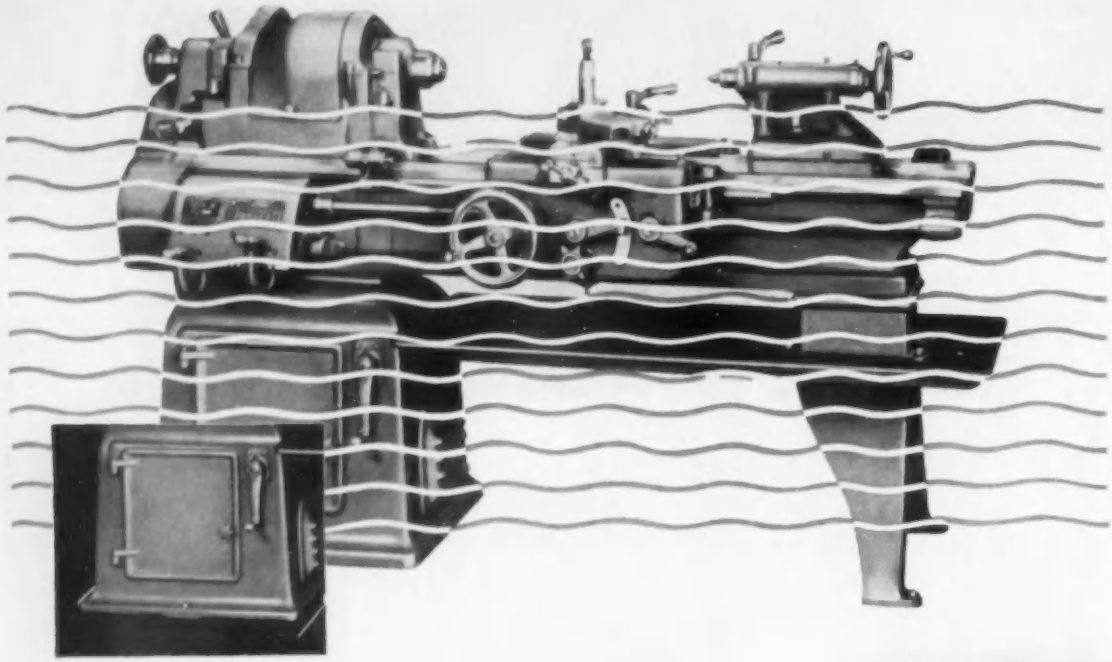
COMPANY _____

STREET _____

CITY _____ STATE _____

TYPE OF BUSINESS _____

* *"Zytel," "Lucite," "Teflon" and "Alathon" are registered trademarks of E. I. du Pont de Nemours & Co. (Inc.)*



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Almost any machine in your plant will run smoother and quieter and with longer time between shut-downs if mounted on Vibration-absorbing Westsorb.

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Pre-applied to both sides. Peel off protective backings and Westsorb is ready for use. Sticks firmly to *any* dry surface – NO BOLTS needed. No down-time waiting for adhesive to set. Operate units immediately.

Dealer Inquiries Invited

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RB&W FASTENER BRIEFS

RUSSELL, BURDSALL & WARD BOLT AND NUT COMPANY

Technical-ities

By John S. Davey

Coarse Threads Better Than Fine For Many Jobs

The load and stress concentrations on threads are lower in standard coarse thread fasteners than in fine threaded ones. Flank engagement is also greater because coarse threads are deeper. Except in such cases where fine adjustments are needed, coarse threads are, therefore, preferable to fine threads. They have greater resistance to stripping and, consequently, can be more highly torqued to make a stronger assembly.

PRODUCTION SAVINGS

Coarse thread fasteners tighten with only two-thirds the revolutions needed for fine threads. So your assembly time is faster, too. Coarse thread bolts enter nuts or mating holes with less tendency to cross thread when not truly positioned. In hard-to-reach areas, this ease of starting can often be your deciding factor. Bear in mind, too, that coarse threads need less "babying" in handling since they're less apt to be damaged.

All in all, coarse threaded standard fasteners prove best for an assembly because of their additional clamping strength—and best for the assembler because of their extra economy and production advantages.

Spin-Lock screws increase holding power by 20%

EXPERIENCE confirms that Spin-Lock screws hold tight under conditions of vibration or repeated heating and cooling. Their strong teeth have a ratchet action on the bearing surface—the acute angle lets the screw tighten fast and easily, until the teeth actually embed into the seat upon tightening, as shown in the sectional photomacrograph below. The almost vertical face of the teeth then resists counter-rotation and loosening. As a result, it takes about 20% more torque to loosen a Spin-Lock than to tighten it.

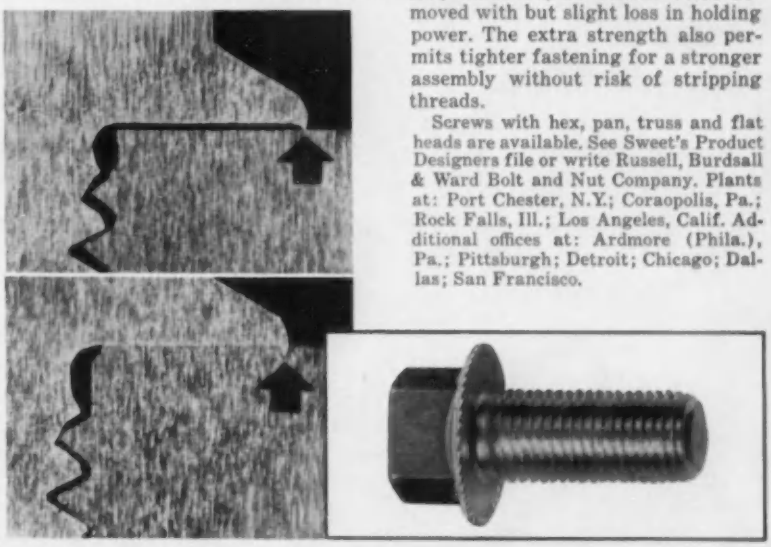
LOWER COST ASSEMBLY

Spin-Lock screws avoid need for washers or external locking devices. One-piece construction, they allow faster assembly and can be easily handled and driven in cramped spaces.

STRONGER ASSEMBLY

Heat treatment gives the teeth hardness and toughness. Spin-Lock screws can, therefore, be reused when removed with but slight loss in holding power. The extra strength also permits tighter fastening for a stronger assembly without risk of stripping threads.

Screws with hex, pan, truss and flat heads are available. See Sweet's Product Designers file or write Russell, Burdsall & Ward Bolt and Nut Company. Plants at: Port Chester, N.Y.; Coraopolis, Pa.; Rock Falls, Ill.; Los Angeles, Calif. Additional offices at: Ardmore (Phila.), Pa.; Pittsburgh; Detroit; Chicago; Dallas; San Francisco.



High strength bolts improved product at a saving

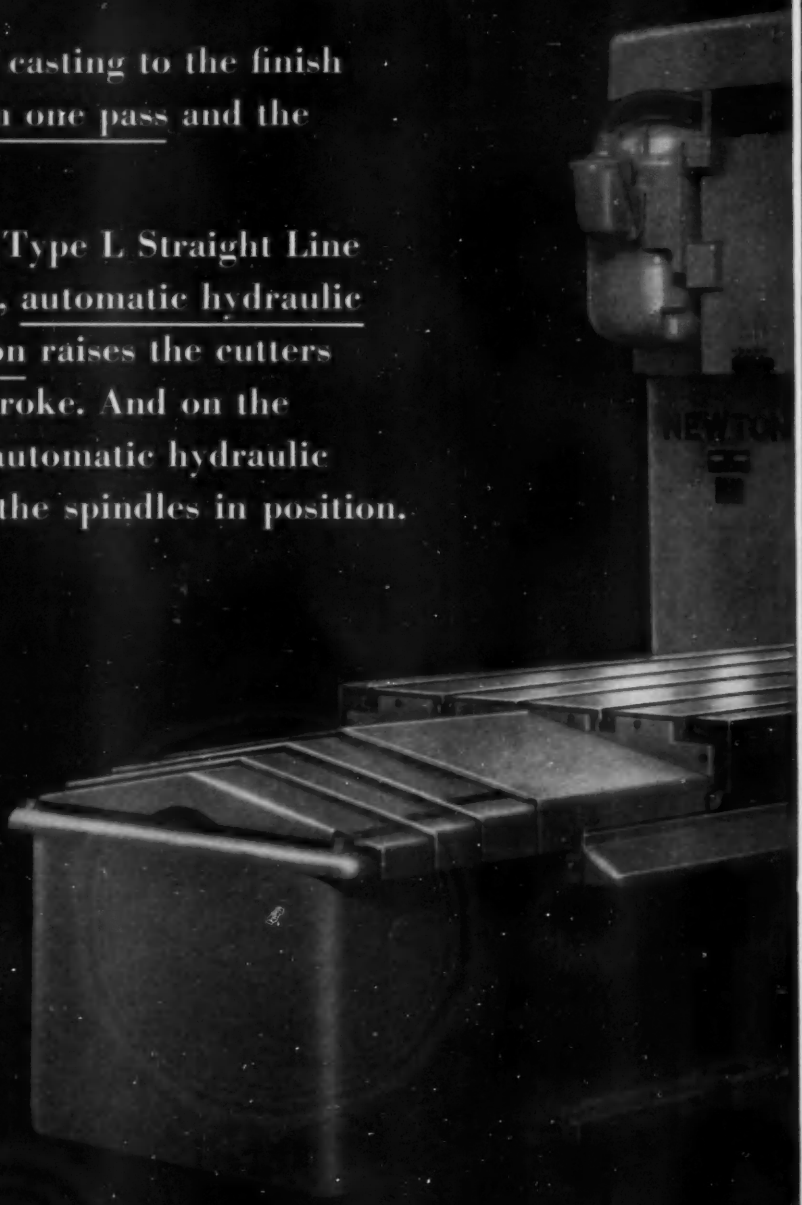
A mechanical vibrating shaker naturally suffers severe abuse itself from vibration. One manufacturer of such machines used costly special fasteners and lock nuts to control tendency of the product to loosen up.

Asked about it, RB&W recommended a standard high strength bolt, heavy nut, and two hardened washers. These permitted a high tensile clamping force to be developed. Residual tension was ample for the most severe operating conditions and kept the bolts tight. Result: A 25% saving in annual fastener cost, the constant availability of standard items, and less maintenance for the product. You too can draw on RB&W experience for technical help to assure a strong assembly and to cut costs.

One Pass . . . and

From the rough casting to the finish milled surface in one pass and the job is done!

On this Newton Type L Straight Line Milling Machine, automatic hydraulic spindle retraction raises the cutters on the return stroke. And on the milling stroke, automatic hydraulic clamping locks the spindles in position.

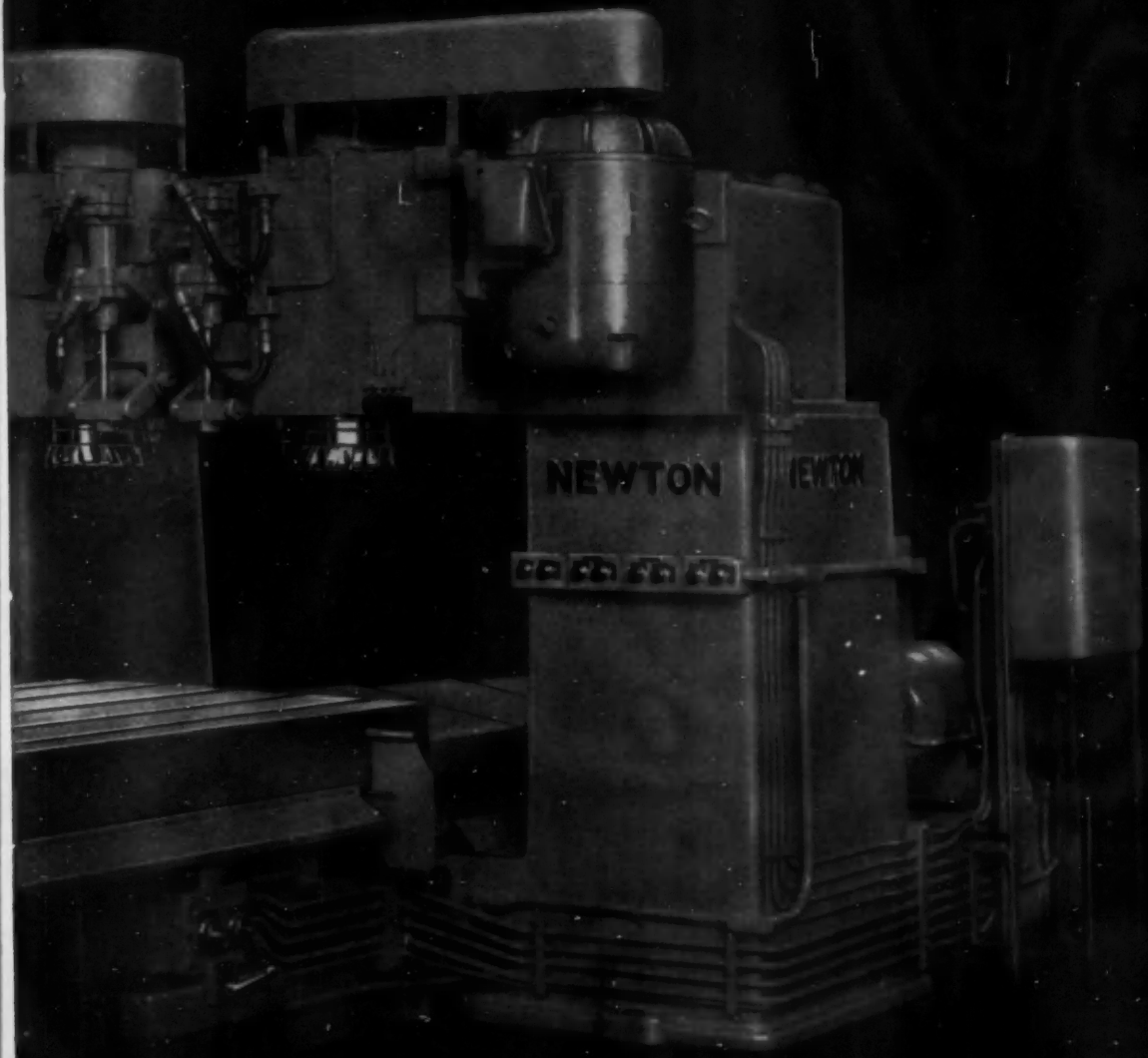


Newton Type L Straight Line Milling Machine with 20 H.P. heads for one-pass milling of aluminum crank cases.

CONSOLIDATED MACHINE TOOL

Wholly owned subsidiary of Farrel-

the Job is Done!



CORPORATION, ROCHESTER, N. Y.

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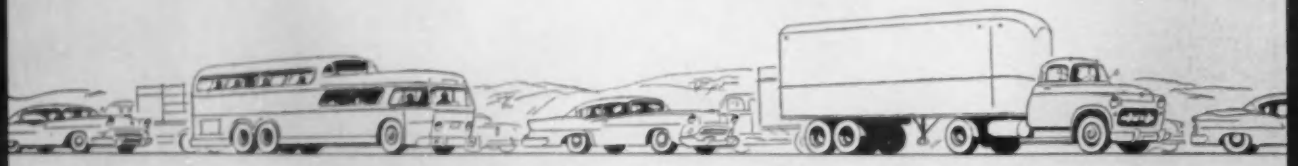
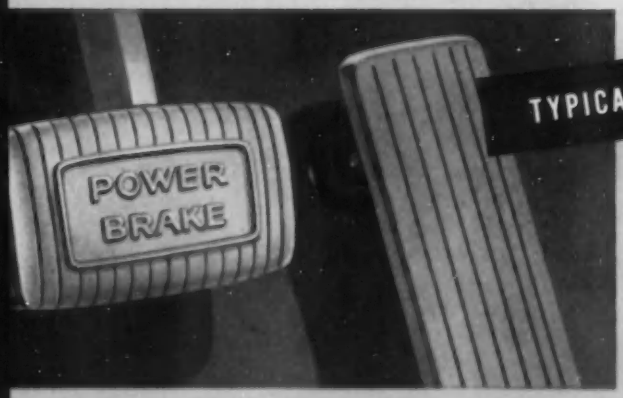
A good reliable source

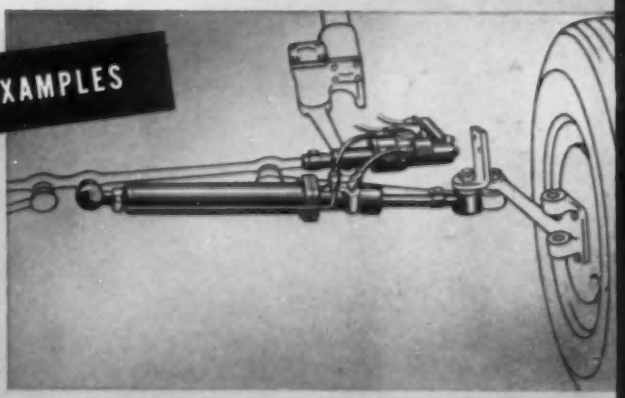
FOR AUTOMOTIVE COMPONENTS

Over two million square feet of floor space at the Bendix Products Division insures the manufacturing capacity to meet volume requirements, with on-schedule deliveries in a wide range of automotive components.



TYPICAL EXAMPLES





BENDIX LOW PEDAL POWER BRAKE—Specified by more car manufacturers than any other make, Bendix* Low Pedal Power Brake makes possible quick, sure stops by merely pivoting the foot from the go to the stop control. No need to lift the foot and exert leg power to bring the car to a stop. Result—more driving comfort, less fatigue and greater safety!

BENDIX LINKAGE TYPE POWER STEERING—Because Bendix* Power Steering is of the linkage type, manufacturers find it especially adaptable for production line installation without extensive engineering changes. Manufacturers can now meet the ever-increasing demand for power steering more efficiently and more economically with Bendix Linkage Type Power Steering.

*REG. U. S. PAT. OFF.

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Bendix AVIATION CORPORATION

AUTOMOTIVE INDUSTRIES

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High Spots of This Issue

★ Dodge Adds Larger V-8 Engine to Line

Carrying on the new Chrysler Corp. styling tradition established last year, the 1956 Dodge includes several added innovations. Highlight of the car's features is a new Super Red Ram engine that develops a sizable 230 hp. Page 48.

★ Custom Building of Heavy-Duty Truck Chassis

Now installed in its $2 million plant at Exton, Pa., Autocar Div. of White Motor Co. is building several types of trucks concurrently. The difficult scheduling involved and how its problems are solved is described in this story. Page 54.

★ Aircooled Diesel Engines Produced With Modern Tools

Backed by a heritage dating back to 1864, the well-known German concern of Klockner-Humboldt-Deutz is most renowned as a builder of aircooled Diesels. Discussed here are some typical interesting factory operations. Page 60.

★ Quality Control Applied in West Coast Bumper Plant

A rigid program of uniformity keynotes the exacting quality control procedures in effect at Rheem Automotive Co. Basic techniques of inspection are applied to every phase of bumper production, as the reader will perceive. See Page 66.

★ Preview of the Metal Show for 1955

Over 400 concerns will display the latest advances in the technology of metalworking at the mammoth exposition being held in Philadelphia this month. In addition to the numerous exhibits, an extensive technical program is planned. Page 74.

★ 82 New Product Items And Other High Spots, Such As:

De Soto, Imperial, Chrysler, Armstrong-Siddeley, Sapphire for 1956; Ford's new Continental; Studebaker-Packard preview; vacuum brake tank production; pre-planned airplane manufacture; hole sizing by carbide balls; and what's new at the Metal Show.

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Automobile and Aviation News, Page 33

AUTOMOTIVE INDUSTRIES COVERS
PASSENGER CARS • TRUCKS • BUSES • AIRCRAFT • TRACTORS • ENGINES • BODIES • TRAILERS • ROAD MACHINERY • FARM MACHINERY • PARTS AND COMPONENTS • ACCESSORIES • PRODUCTION EQUIPMENT • SERVICE EQUIPMENT • MAINTENANCE EQUIPMENT
ENGINEERING • PRODUCTION • MANAGEMENT

Do you really know the alloys you buy?

For instance, are you SURE of:

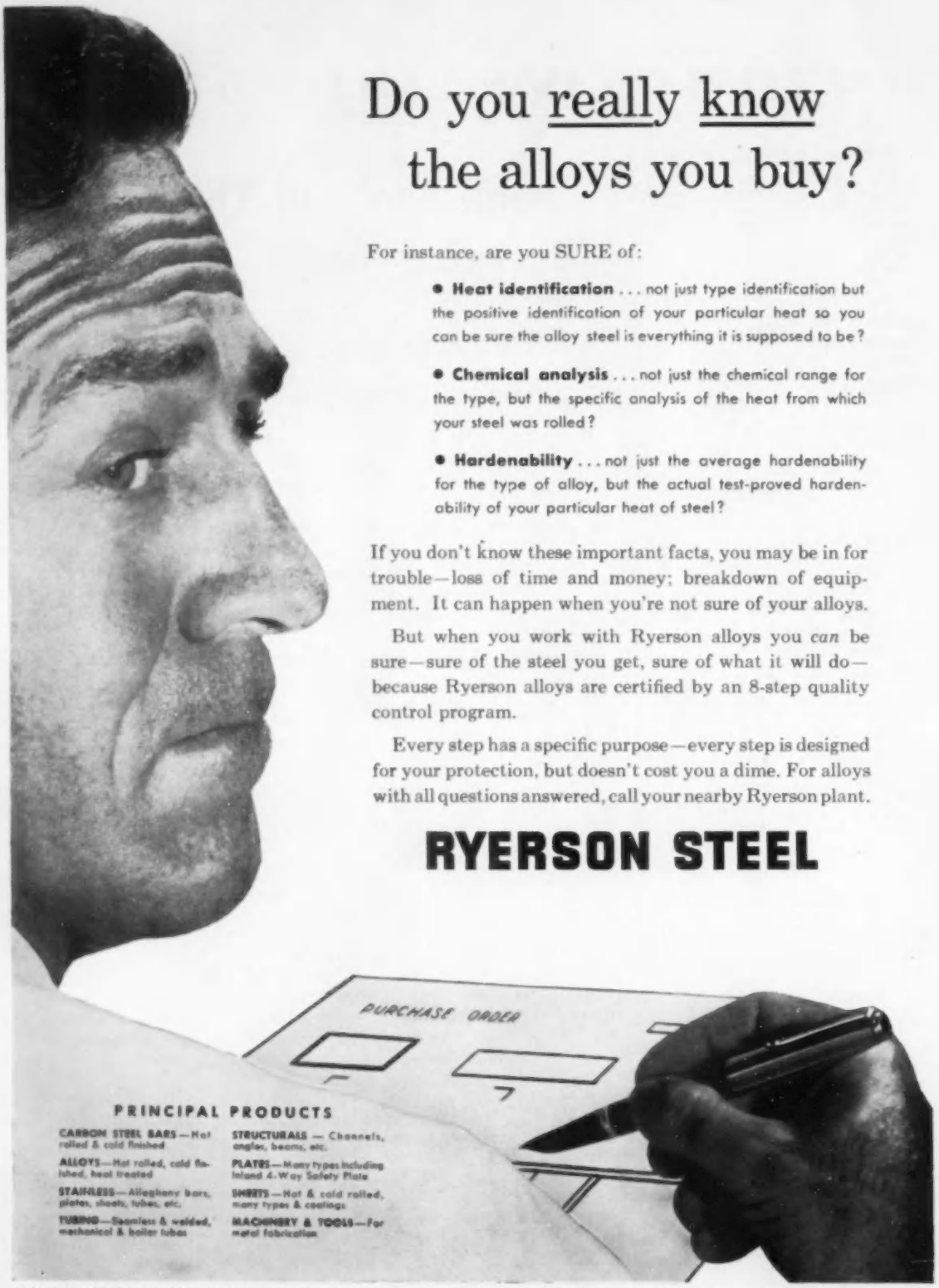
- **Heat identification** . . . not just type identification but the positive identification of your particular heat so you can be sure the alloy steel is everything it is supposed to be?
- **Chemical analysis** . . . not just the chemical range for the type, but the specific analysis of the heat from which your steel was rolled?
- **Hardenability** . . . not just the average hardenability for the type of alloy, but the actual test-proved hardenability of your particular heat of steel?

If you don't know these important facts, you may be in for trouble—loss of time and money; breakdown of equipment. It can happen when you're not sure of your alloys.

But when you work with Ryerson alloys you *can* be sure—sure of the steel you get, sure of what it will do—because Ryerson alloys are certified by an 8-step quality control program.

Every step has a specific purpose—every step is designed for your protection, but doesn't cost you a dime. For alloys with all questions answered, call your nearby Ryerson plant.

RYERSON STEEL



PRINCIPAL PRODUCTS

CARBON STEEL BARS—Hot rolled & cold finished

ALLOYS—Hot rolled, cold finished, heat treated

STAINLESS—Alleghany bars, plates, sheets, tubes, etc.

TUBING—Seamless & welded, mechanical & boiler tubes

STRUCTURALS—Channels, angles, beams, etc.

PLATES—Many types including Inland 4-Way Safety Plate

SHEETS—Hot & cold rolled, many types & coatings

MACHINERY & TOOLS—For metal fabrication

JOSEPH T. RYERSON & SON, INC. PLANTS AT: NEW YORK • BOSTON • PHILADELPHIA • CHARLOTTE, N. C. • CINCINNATI • CLEVELAND DETROIT • PITTSBURGH • BUFFALO • CHICAGO • MILWAUKEE • ST. LOUIS • LOS ANGELES • SAN FRANCISCO • SPOKANE • SEATTLE

News of the AUTOMOTIVE AND AVIATION INDUSTRIES

Vol. 113, No. 8 October 15, 1955

Ford To Spend Half Billion On Expansion on Next Year

The decision by Ford Motor Co. to spend $500 million on expansion in 1956 indicates that additional new plants may be announced within the next few months. Ford is willing to gamble that amount on the future economy of the country and is accelerating its previously announced $625 million expansion program.

Ford said the half-billion figure would be spent next year on a dozen projects, some of which are now underway, instead of spreading it over a three-year period, as originally planned. Just at presstime, it was announced that Ford will also spend another $500 million for expansion in the two-year period of 1957-58.

Henry Ford II, president of Ford Motor Co., said the money would come from earnings and not borrowing. The half-billion dollar figure will set a record for the company for plant expenditures during any single year.

Automotive Parts Business To Top $8 Billion in 1955

Automotive replacement parts and customer labor sales will ring up an all-time high total of $8.1 billion this year. That is the finding of a study made by one of the automobile manufacturing companies. The breakdown shows that retail parts sales this year will hit $4.115 billion.

Kaiser Quits Car Field; To Concentrate On Jeeps

Kaiser Motors is out of the passenger car business for good. It is said to have no plans to resume production of either Kaiser or Willys cars in the U. S. It will concentrate its entire activities on its line of utility commercial vehicles.

The company has lined up about 500 new dealers in the last six months, many of whom are using GMAC financing. Another interesting fact is that many of the Willys dealers are dualed with GM passenger car dealers, some with independents, and some with International Harvester. Kaiser Motors built only a little over 6500 cars this year.

TWO-SEATER MG SPORTSTER TAKES ON A TRIM LOOK

The new MG A two-seater sports car with streamlined body discards the traditional form of the MG Midget which it supersedes. The chassis was developed from competition prototypes run at Bonneville Flats, Utah, and Le Mans, France. Outswept side members, with driver and passenger seats sunk between them and the central tunnel, provide a low center of gravity. The four-cylinder, 90.88 cu in. engine is similar to that used in the MG Magnette and has an output of 68 bhp at 5500 rpm.

GM Shareholders Approve Three-For-One Stock Split

Shareholders of General Motors Corp. solidly approved a three-for-one stock split. The action came at a meeting at GM's B-O-P plant near Wilmington, Del., when shareholders approved the proposal by 99 per cent of the shares voted.

The stock split is designed to achieve wider distribution of nearly 92 million shares of stock outstanding. A savings-stock purchase plan, under which GM salaried employes can purchase stock at a reduced rate, also was approved by an overwhelming vote as expected.

Most Car Concerns To Offer Four-Door Hardtops In '56

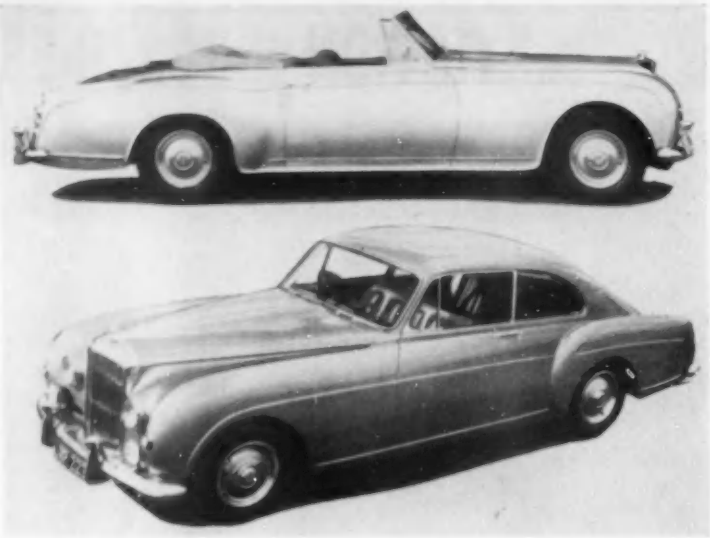
Practically every automobile producer will offer a four-door hardtop in 1956. All of the Big Three manufacturers will make such models available, even in their volume lines.

Brought out less than a year ago, the pillarless body style is expected to account for a sizable portion of the total market next year. So far more than 250,000 of the models have been produced by Oldsmobile and Buick, the only two car manufacturers which offered four-door hardtops in the 1955 line of cars.

Detroit Firm Bought By Sparks-Withington

All capital stock of the 20-year-old Allied Steel & Conveyors, Inc., Detroit, has been acquired by Sparks-Withington Co., Jackson, Mich., which will operate the concern as a wholly-owned subsidiary. Allied Steel sales are reported at $4.5 million annually.

News of the AUTOMOTIVE



BENTLEY CONTINENTAL OFFERED IN THREE BODIES

Bentley Motors (1931), Ltd., has introduced a new Bentley Continental that is a special version of its Bentley "S" Series sedan with a lightweight all-metal body. There are three different body stylings—a sports sedan, a Drophead Coupé by Park Ward (top) and a sports sedan by Mulliner. The car is powered by a six-cylinder engine with a bore of 3¾ in., stroke of 4½ in., and a compression ratio of 7.25 to 1. It is 17 ft, six in. long, five ft, 11½ in. high, and has a wheelbase of 10 ft, three in.

BOYERTOWN BODIES OFFER GREATER LOAD SPACE

This new series of delivery bodies, built by Boyertown Auto Body Works, has been designed to mount on the new forward control stripped chassis. Greater load space has been provided with an increased interior width of 74 in. Redesigned front of these steel Merchandiser bodies is said to provide weight savings as well as easy repairability and replacement of parts. Engine accessibility has also been improved.

Sale Of Universal Products To Chrysler Set For Oct. 31

Chrysler Corp. will take over the plants, equipment, and inventories of Universal Products Co. on Oct. 31, if stockholders of the latter concern approve the agreement. The purchase price, estimated at about $3 million, depending upon inventories on hand Oct. 31, also includes the Formetal Co., a wholly-owned subsidiary of Universal located in Ecorse, Mich.

Universal Products properties include buildings with a total floor area of 300,000 sq ft on 14 acres of land. The Ecorse plant, which provides about 26,700 sq ft of space, makes stampings and forgings, while the Dearborn plant produces automotive drive shafts and their components. About 85 per cent of Universal's output has been going to Chrysler in recent years.

Willys Adds CJ-6 Model to Jeep Line

Willys has added another utility vehicle to its family of four-wheel-drive products. The new unit is a 101-in. wheelbase Jeep with a rated half-ton load capacity.

The makers point out that the CJ-6, as it is designated, simply will augment the current line of Universal Jeep vehicles. It is not a replacement for any model.

The vehicle fills the gap between the standard quarter-ton Willys Jeep with 81-in. wheelbase and the 118-in. wheelbase one-ton Jeep truck.

Overall length of the CJ-6 is 155.56 in., 20 in. longer than the standard Jeep. It is powered by the same four-cylinder, 75-hp F-head Hurricane engine.

Peak Sales of $470 Million Reported By Dow For Period

Dow Chemical Co. sales climbed to a record $470.7 million during the 1955 fiscal year ended May 31, or nine per cent over the previous record set in 1953 and 10 per cent over last year. According to the company's annual report to stockholders, earnings for the period rose 12 per cent to $37.4 million, compared with $33.4 in 1954.

AND AVIATION INDUSTRIES

S-P Segregates Operations Into Five Distinct Groups

In line with the practice of other car companies, Studebaker-Packard Corp. is continuing to divisionalize its operations. The corporation has set up four more divisions and each now operates as a separate and distinct unit.

Automotive operations of Packard and Clipper have been consolidated into a Packard-Clipper Div. Studebaker car and truck operations now will be administered by a newly formed Studebaker Div.

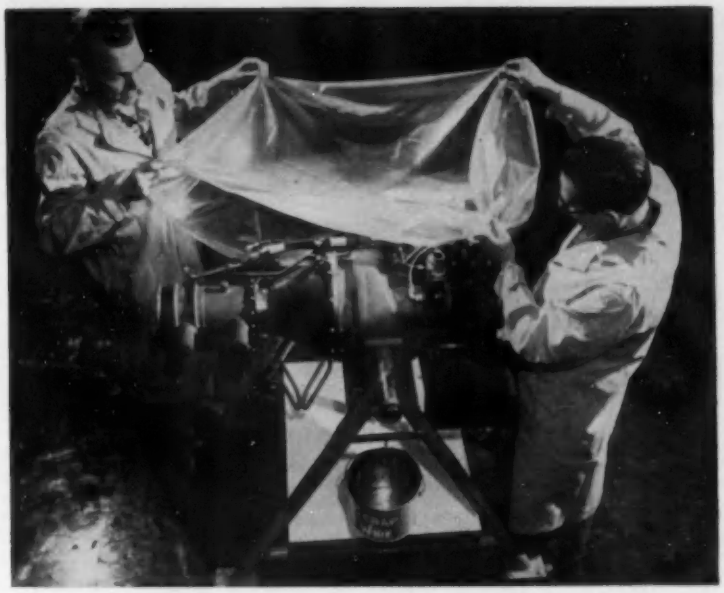
Two other newly organized divisions are an S-P Parts and Accessories Div. and the Studebaker-Packard Corp. of Canada Div. Earlier this year the corporation established a division to coordinate all Government and industrial products programs.

Foundation Delays Sale of Ford Stock

Several complications which could delay the sale until next year have entered into the proposal to sell Ford stock. Earlier this year it was expected that a definite date for public offering would be set by the Ford Foundation trustees at the fiscal year meeting held in October. No definite action has yet been taken, however, although the stock issue came up for considerable discussion.

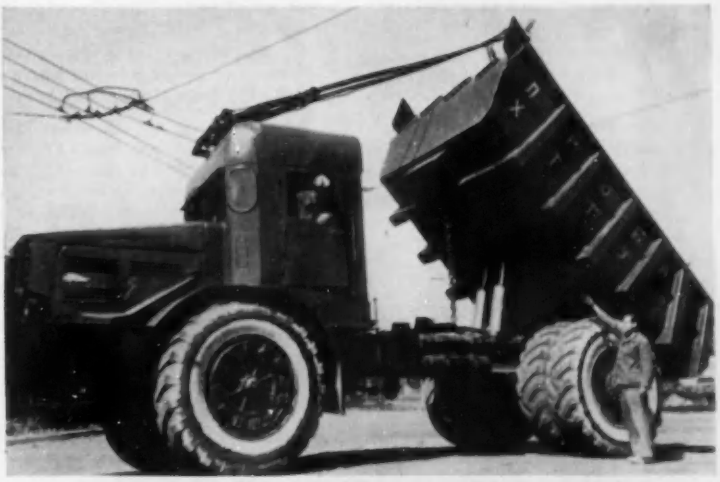
Basic stumbling blocks are the manner in which the stock should be split, how much of it would be offered, the price, and whether to market it through underwriters or use some other method. Several tax complications reportedly also have further delayed sale. The Foundation also is said to feel there is no urgency for sale of the stock, since its current income is sufficient to meet expenses and grants.

Ford stock presently carries a book value of $135 a share. Investment experts, however, feel it is undervalued and that the Foundation could get more. Of the outstanding 3,280,255 Class A non-voting Ford Motor shares, the Foundation owns 3,089,908, while the remaining 190,347 shares are held by the Ford family, which also holds 172,645 Class B shares.



ACCESSORY TURBINES PROTECTED AGAINST DUST

Aircraft accessory turbines are sealed at the end of each working day at the General Electric plant in Lynn, Mass. They are also covered with a polyethylene sheet as an added safeguard against dust. These drives for supplying auxiliary power for jet aircraft are sealed prior to shipping, and any foreign matter left inside might affect efficiency. Other precautions, such as a ban against sweeping, are also taken here.



RUSSIAN MINING DUMP TRUCK ELECTRIFIED

Russia is now producing an electrified version of its MAZ 525 25-ton dump truck. Main application is said to be for work at mines, where a network of overhead trolley wires is installed. No details of the electrical system are known, but the truck is normally powered by a V-12 Diesel engine rated at 300 bhp at 1700 rpm.

News of the AUTOMOTIVE

STAINLESS STEELS FEATURED IN GM AEROTRAIN

Stainless steels are widely used in the new General Motors Aerotrain. Shown for the first time during the recent GM Powerama in Chicago, the new experimental train has a locomotive that is 53 ft long and 13 ft, seven in. above rail; it is powered by a 1200-hp GM Diesel engine. In addition to the Allegheny Ludlum stainless steels which were used to cover the lower sections of the coaches, these materials were also employed for many other applications on the train.

Mercury '56 Price Increases Range from $57 to $137

Mercury has followed the pattern of Ford and Lincoln in boosting prices on 1956 models. Howeve₁, unlike Ford, Mercury's biggest price increase appears on two models in the middle and top priced series. Ford earlier posted its largest rate increase on the lowest price Mainline series.

The Mercury price increases range from $57 on the Montclair four-door sports sedan to $137 on the Montclair convertible, or 2.3 per cent to 5.5 per cent higher than 1955 models. Prices on some optional equipment were decreased, however.

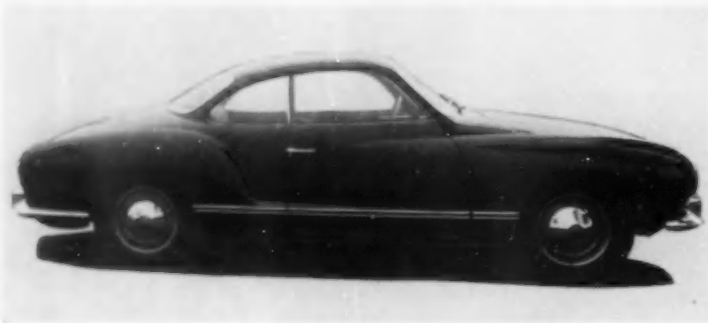
Air conditioning units were reduced from $550 to $470. Power seats (at $60) and radios (at $89.50) remain the same, but power steering was reduced to $75 from $100; power brakes to $35 from $37.50; and power windows to $90 from $95.

Addition of three new models—a low priced two-door Medalist sedan, a four-door station wagon, and a four-door sports sedan—brings to 13 the number of Mercury models offered for 1956. A special package of safety items also will be available.

MERCURY PRICES*

Custom Series	1956	1955
Medalist 2-door	$2,012	....
Two-door Sedan	2,102	$2,015
Four-door Sedan	2,157	2,070
Two-door Hardtop	2,227	2,130
Station Wagon (6 pass.)	2,447	....
Station Wagon (8 pass.)	2,537	2,450
Monterey Series		
Four-door Sedan	2,292	2,185
Four-door Sport Sedan	2,382	....
Two-door Hardtop	2,362	2,245
Station Wagon (8 pass.)	2,684	2,597
Montclair Series		
Four-door Sport Sedan	2,507	2,450
Two-door Hardtop	2,487	2,400
Convertible	2,612	2,475

* Suggested list prices, not including distribution and delivery charges, preparation and conditioning charges, Federal excise taxes, state or local taxes, license fees, optional equipment, and accessories.



GLAMORIZED VOLKSWAGEN IS ADDED TO CAR LINE

Italian lines for the Volkswagen have been provided by Ghia in the design of this two-seater sports body. The model is in limited production by Karmann in Osnabrück, Germany, and is expected to be available to the American market shortly. Chassis and all mechanical parts are standard and are supplied from the Wolfsburg factory. Cruising speed of 70 mph is said to be possible with the rear-mounted, aircooled engine.

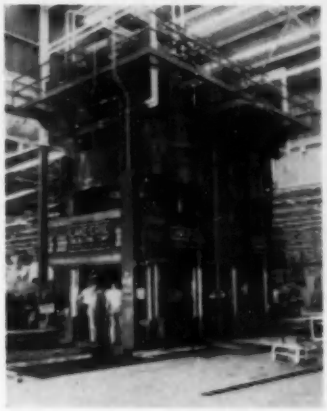
Ford Division Breaks Ground For New General Office Unit

Automobile companies are continuing their expansion programs at a fast pace. Ford Div. of Ford Motor Co. has announced that ground has been broken for a 453,000 sq ft general office building in Dearborn, Mich. To be located on a 67-acre site near Ford's present test track, the five-story ultra-modern building is expected to cost $10 million. It will house the division's sales, industrial relations, purchasing, controller's, manufacturing, and parts accessories operations offices.

The structure will be of "floating design." The first level will be set 12 ft inside the upper four floors. Each floor will extend six ft beyond the exterior walls to provide a "shade" above the continuous band of windows around the building.

Scheduled for completion in 1957, the new building will replace the division's present headquarters at Plymouth and Middlebelt Roads in Livonia. The latter will remain as the division's central parts depot.

AND AVIATION INDUSTRIES



VOODOO WINGS PRESSED

McDonnell Aircraft Corp. has disclosed that wing skins of the F-101 Voodoo twin-jet supersonic fighter are now being fabricated on a hydraulic press with a capacity of 10,000 tons. Massive jaws of the unit will stretch-press a complete wing skin—94 sq feet of metal—in one operation. Built by Lake Erie Engineering Corp., the huge press weighs 2.8 million lb and is housed in a pit which required about 4.5 million lb of concrete to form.

Federal Truck Operations Shifting To Minneapolis

Federal Motor Truck operations gradually are being moved out of Detroit. Although the Federal plant in Detroit is expected to be retained under its new owner, Napco Industries, Inc., present plans call for transferring all truck manufacturing operations to Minneapolis, Napco headquarters, by the end of the year.

It is understood that the Detroit plant may be used either as a manufacturing facility for other Napco products or may be retained as a truck, branch service, and parts depot. Napco is constructing a new 300,000 sq ft plant in Minneapolis for manufacture of Federal trucks. Costing in the neighborhood of $1 million, the plant is expected to do an annual volume of $10 million.

In addition to standard trucks, the plant will build special types of trucks up to 26 tons in size, dump trucks, cranes and tractors, and parts. Napco also makes front axle drive conversion units for Chevrolet and GMC trucks. Napco acquired Federal Motor Truck about a year ago.

AI TABLOID

Ford Motor Co. dedicated its new automobile and truck assembly plant at Mahwah, N. J., on Sept. 29.

* * *

Westinghouse Electric Corp. has set up a new commercial atomic power organization.

* * *

Cleveland Aero Products, Inc. has moved to a new manufacturing plant at 13801 Triskett Rd., Cleveland, O. . . . West Instrument Corp. has moved to new facilities at 4363 W. Montrose Ave., Chicago, Ill.

* * *

Harvey Aluminum Co. will start construction early in 1956 of its $65 million primary aluminum facility in Oregon.

* * *

Kloecker-Humbodt-Deutz A. G. is said to be looking for a partnership with a large American industrial equipment company for the manufacture in the U. S. of the Deutz aircooled Diesel engine.

* * *

The Navy has announced that flight tests of its new 600-mph multi-jet seaplane—the XP6M-1 Martin SeaMaster (see AI, Jan 15, p. 36)—have proved the aircraft to be quite promising. . . . Solar Aircraft Co. has disclosed that its 500-hp Jupiter gas turbine is powering a small Navy boat.

* * *

Westinghouse Electric Corp. is adding 66,000 sq ft to Lamp Div. plant at Fairmont, W. Va.

* * *

Signode Steel Strapping Co. has developed a new portable air-powered strapping machine.

* * *

Goodyear Tire & Rubber Co. has announced that it is in the midst of a two-year plant expansion and improvement program involving a capital outlay of $100 million.

Caterpillar Tractor Co. has announced two new heavy-duty D342 and D339 engines.

* * *

Eastern Air Lines has announced a $350 million expansion program that will add 100 new airliners to its routes by 1961.

* * *

Rheem Mfg. Co. is undertaking a broad expansion of its Automotive Div. with plans for a new plant in Fullerton, Calif. . . . General Electric Co. will build a new $5 million plant at Lynchburg, Va., for its Rectifier Dept.

* * *

Curtiss-Wright Corp. has been granted a license to manufacture printed electrical circuits by Technograph Printed Electronics, Inc.

* * *

George L. Nankervis Co. has announced that it has completed negotiations to purchase the entire assets of the Commercial Research Laboratories, Inc.

* * *

Stockholders of Piasecki Helicopter Corp. will vote Oct. 27 on a proposed change in the company's name to Vertiplane Corp.

* * *

Temco Aircraft Corp. has been selected to engineer, tool, and manufacture two major assemblies for the Lockheed Electra turboprop plane.

* * *

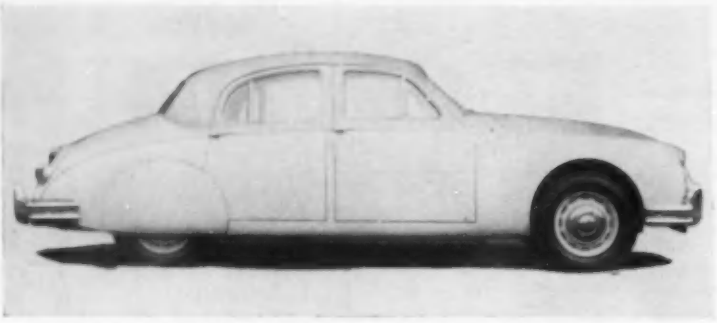
Mallory-Sharon Titanium Corp. has launched a "quality certification" program to improve uniformity of unalloyed titanium sheets.

* * *

Pittsburgh Steel Co. has started a $15 million building and improvement program that will increase its steelmaking capacity by about 15 per cent.

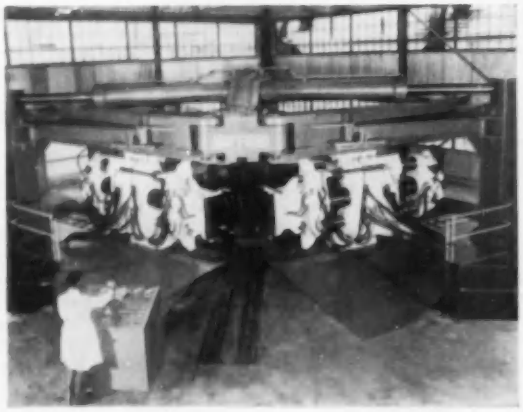
(Turn to page 196, please)

News of the AUTOMOTIVE



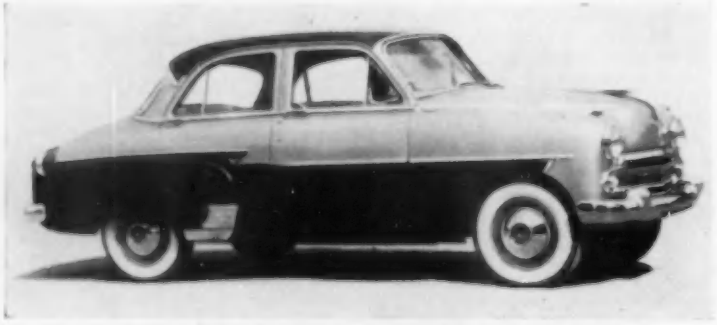
JAGUAR WITH INTEGRAL BODY-FRAME CONSTRUCTION

The new Jaguar four-door sedan uses the existing six-cylinder engine of 151.5 cu in. displacement; stroke has been shortened to give an output of 112 bhp at 5750 rpm. Integral body chassis is used to reduce weight to 2800 lb for 100 mph performance.



GIANT FORMER

This huge Model 60 Hufford stretch-wrap forming machine with 350 tons of stretching capacity was recently installed at Rohr Aircraft Corp. to produce aircraft components. Parts from both extruded material and sheets are formed by stretching and wrapping stock around a stationary die. The two large arms are pivoted near the central die location and are wrapped back by means of four huge hydraulic actuating cylinders on the unit.



VAUXHALL CRESTA INCORPORATES SEVERAL CHANGES

Styling changes for General Motors' 1956 Vauxhall Cresta include two-tone paintwork increased glass area, wrap-around rear windows, and new door locks and catches. Brakes have been redesigned with hub and drum assemblies separate to give access to brake shoes without removing the hub.

Ford Plots $50 Million Outlay On New Engineering Facilities

Speaking at a press showing of its engineering facilities early this month, Ernest R. Breech, chairman of the board of Ford Motor Co., stated that a $50 million expansion of these facilities is planned. Expected to be completed in the fall of 1957, the program will add more than one million sq ft of working space to the company's Research and Engineering Center at Dearborn, Mich.

Included in the new construction plans are five new buildings to house Ford, Mercury, Lincoln, Special Products, and Staff Engineering activities. A new wind tunnel and a 140,000 sq ft addition to the body engineering area will also be built.

A. A. Kucher, director of the Ford scientific laboratory, discussed the future of the gas turbine engine. Predicting that a substantial number of passenger vehicles would be equipped with such engines within the next 10 years, he commented that Ford is also studying other types of engines, such as free-piston ones, for possible future applications.

Futuristic Car Unveiled

Ford also took advantage of the occasion to display a new plastic experimental car with a hinged bubble-type glass top. Called the Mystere, it has a steering device outfitted with controls operated by buttons and triggers that can be pivoted in front of either front seat passenger. Instead of an ignition switch, a dial of buttons is provided to turn on the engine.

The rear engine compartment is designed to accommodate either a gas turbine or a conventional engine. Large rear bumper assemblies contain turbine exhausts and tail lights. Front bumpers have horizontal openings to allow air to enter and cool oil reservoirs. Perforated scoops in front of the rear wheels serve as air intakes for the possible future gas turbine engine. Four headlights are used on the car.

The Mystere is the same height—52 in.—as the Ford Thunderbird. Its overall length is 220 in., and maximum width is 80 in.

AND AVIATION INDUSTRIES

Dodge Boosts 1956 Prices On Cars From $87 to $152

Dodge, first Chrysler Corp. Div. to unveil 1956 models, has increased prices by from $87 to $152, an average boost of 4.8 per cent above 1955 models. On the other hand, prices on several optional items have been reduced, and several items, which were offered at extra cost on 1955 models, now are standard.

DODGE PRICES*

	1956	1955
CORONET 6		
Club Sedan	$1961	$1838
4-Door Sedan	2029	1912
CORONET V-8		
4-Door Sedan	2129	2008
Club Sedan	2061	1941
Lancer 4-Door Hardtop	2293	(N/O)
Lancer 2-dr. Hardtop	2187	2067
Convertible	2418	(N/O)
ROYAL V-8		
4-Door Sedan	2257	2114
Lancer 4-dr. Hardtop	2426	(N/O)
Lancer 2-dr. Hardtop	2322	2193
CUSTOM ROYAL V-8		
4-Door Sedan	2359	2268
Lancer 4-dr. Hardtop	2530	(N/O)
Lancer 2-dr. Hardtop	2424	2330
Convertible	2626	2521
STATION WAGONS		
Suburban 6	2237	2150
Suburban V-8	2337	2246
Custom Suburban V-8	2457	(N/O)
Sierra 6-Pass. V-8	2446	2352
Sierra 8-Pass. V-8	2544	2447
Custom Sierra 6-Pass. V-8	2587	2438
Custom Sierra 8-Pass. V-8	2685	2533

* Factory delivery prices, not including distribution, excise taxes, and handling charges or state and local taxes.
Note: N/O means "not offered."

For example, the larger horsepower engine is standard on the Royal four-door model for 1956. A comparable engine cost an additional $69.50 for the same 1955 model. Power steering was reduced from $105 to $85 and overdrive transmission from $100 to $95. Automatic transmission, which features a push-button selector system, is priced at $170, or $5 above the 1955 transmission which had a gear selector handle located on the dashboard. Prices remain the same on radios, power brakes, power windows, power seats and air conditioning.

Dodge this year for the first time has grouped all its station wagons under a separate series, to be known as the "Station Wagon" series. Previously lower-priced station wagons were classified under the Coronet series while the plushier models came under the Royal series. None will be identified with these series now.

(*Turn to page* 104, *please*)

SALES FOR EIGHT MONTHS SHATTER PREVIOUS MARKS

1955 U. S. Motor Vehicle Factory Sales*

	Passenger Cars	Trucks	Buses	Totals 1955	Totals 1954
January	635,513	89,676	190	725,379	551,134
February	677,705	67,061	176	744,942	534,145
March	791,280	102,992	329	894,597	633,004
April	753,434	127,887	519	881,840	631,769
May	721,139	127,941	313	849,393	568,611
June	647,658	119,215	309	767,182	598,676
July	656,736	100,589	296	788,621	530,415
August	620,610	95,119	434	716,163	521,480
Total—Eight Months	5,506,075	839,480	2,562	6,348,117	4,589,454

1955 U. S. Motor Truck Factory Sales by G.V.W.*

	5,000 lb. and less	5,001-10,000	10,001-14,000	14,001-16,000	16,001-19,500	19,501-26,000	Over 26,000	Total
January	42,396	15,055	4,089	16,489	4,743	3,007	3,927	89,676
February	30,036	11,277	2,645	11,911	3,875	3,095	4,222	67,061
March	48,816	18,275	4,155	19,176	4,364	3,241	4,965	102,992
April	61,365	22,178	4,834	23,779	5,416	4,231	6,084	127,887
May	60,287	21,721	5,149	24,420	6,406	3,734	6,222	127,941
June	52,720	20,753	4,105	22,677	7,709	4,393	6,858	119,215
July	48,363	18,813	3,711	22,164	6,753	4,221	5,564	109,509
August	41,482	16,015	3,206	19,467	5,966	3,470	5,519	95,119
Total—8 Mos. 1955	385,465	144,087	31,966	160,253	45,226	29,392	43,161	839,480
Total—8 Mos. 1954	331,309	129,699	27,109	137,818	31,133	33,700	27,421	718,248

* Automobile Manufacturers Association.

ALL MAKERS BUT K-W SHOW HUGE GAINS OVER '54

1955 Passenger Car Production

As reported direct to Automotive Industries by the car factories

	September 1955	August 1955	September 1954	Nine Months 1955	Nine Months 1954
Hudson	1,747	2,186	3,517	41,277	24,549
Nash	3,406	4,923	5,940	88,742	49,615
Total—American Motors	5,153	7,111	9,457	130,019	74,164
Chrysler	5,697	244	3	129,777	86,777
De Soto	5,580	602	1	94,697	45,883
Dodge	20,398	10,690	113	228,930	95,699
Plymouth	4,224	57,620	1,861	539,711	282,431
Total—Chrysler Motors	35,899	69,056	1,979	993,115	490,990
Ford	130,063	140,453	114,143	1,295,374	1,100,119
Lincoln	3,788	1,764	2,353	27,398	29,703
Mercury	24,896	26,930	21,847	318,828	211,103
Total—Ford Motors	134,767	169,155	138,343	1,631,600	1,340,925
Buick	67,592	66,363	41,619	629,654	416,053
Cadillac	3,753	14,664	10,674	113,709	94,114
Chevrolet	130,534	164,016	37,690	1,405,505	1,053,737
Oldsmobile	53,452	59,903	34,907	502,945	333,133
Pontiac	24,649	51,511	4,230	437,179	253,955
Total—General Motors	279,979	356,763	129,124	3,088,992	2,150,992
Packard	196	4,459	1,322	53,508	25,251
Studebaker	5,352	8,351	5,115	89,396	54,799
Total—S-P Corp.	5,548	12,810	6,437	142,904	80,050
Kaiser	None	None	None	1,002	5,099
Willys	None	None	380	5,677	9,367
Total—Willys Motors	None	None	380	6,679	14,466
Total—All Makes	461,327	614,396	285,719	5,993,309	4,121,547

WHENEVER YOU SEE the number HM89410 on the cup—and HM89446 on the cone—you're sure the tapered roller bearing is a certain size commonly used on pinions. But when you also see the trademark "Timken", you can feel it's your lucky number. You're getting *extra* quality and service.

THIS IS YOUR LUCKY NUMBER

HER JOB IS NEAR PERFECTION. She uses this machine to measure bore size and roundness of Timken bearing cones in ten-thousandths of an inch. Cones are then sorted into sub-sizes by O. D. and matched with rollers that have also been subsized. It's this precision manufacture that pays off in longer life, less maintenance.

QUALITY CONTROL YOU CAN'T GET ELSEWHERE. To control Timken® bearing quality every step of the way, we make our own steel. America's only bearing manufacturer that does. And we make it nickel-rich for superior toughness.

WHAT'S AHEAD? This machine studies the effects of vibration on bearings. It's part of our program to make bearings last even longer. When you specify a bearing number, always specify "Timken", too. And for *full* value, always use a Timken bearing cone with a Timken bearing cup. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

TIMKEN is number 1 for VALUE where value counts most . . . in the vital zone

TRADE-MARK REG. U. S. PAT. OFF.

NOT JUST A BALL ○ NOT JUST A ROLLER ⊂ THE TIMKEN TAPERED ROLLER ⊂ BEARING TAKES RADIAL AND THRUST LOADS OR ANY COMBINATION

Men in the News

White Motor Co.—Thomas J. Delaney has been named director of advertising and sales promotion.

Allison Div., General Motors Corp. —**E. M. Deckman** has been appointed commercial sales manager of aircraft engines.

Brown Instruments Div., Minneapolis-Honeywell Regulator Co.—**C. L. Peterson** has been appointed vice-president and general manager.

General Electric Co.—**William A. Mann** has been elected a commercial vice-president.

Fisher Body Div., General Motors Corp.—**Frank H. Burns** has been named director of material handling and traffic.

Dodge Div., Chrysler Corp.—**Jack W. Minor** has been promoted to sales manager in charge of advertising, merchandising, and related sales activities.

Greer Marine Corp.—**G. Lawton Johnson** was elected president.

Michiana Products Corp.—**C. Don Hicks** is now vice-president.

Chrysler Div., Chrysler Corp.—**Sam C. Mitchell** has been promoted to western division sales manager.

Timken Roller Bearing Co.—**Ralph W. Updegraff** has been promoted to chief industrial engineer; **Ross Russell,** industrial engineer for the Steel and Tube Div.; and **Clyde L. Van Horn,** chief cost accountant.

R. L. Polk & Co., Direct Mail Div.—**William H. Beatty** is now vice-president and general manager.

Studebaker-Packard Corp.—Robert P. Laughna has been named manager of the Packard-Clipper Div., and Harold E. Churchill has been appointed manager of the Studebaker Div.

New York Air Brake Co.—**R. J. Murphy** has been appointed sales manager of the Hydreco and Dudco Divs.

Eclipse-Pioneer Div., Bendix Aviation Corp.—**Dan S. Tilden** has been appointed commercial sales manager.

American Motors Corp., Automotive Export Div.—**Kenneth M. Silcock** has been chosen assistant to the manager.

Oldsmobile Div., General Motors Corp.—**Charles R. Fraser** has been made assistant to the director of purchases.

Birdsboro Steel Foundry & Machine Co.—**Lewis W. King** has been appointed assistant to the vice-president of engineering, and **Ralph H. Scholl** has been named manager of the Roll Dept.

Chevrolet Motor Div., General Motors Corp.—**Sylvester J. Thrasher** has been named plant manager at the transmission plant in Saginaw, Mich.

Temco Aircraft Corp.—**William N. Rathbun** has been named plant facilities engineer, and **James F. Parrish** succeeds him as chief industrial engineer.

R. E. Dietz Co.—**G. L. Petrie** has been made purchasing agent.

Kearney & Trecker Corp.—Orrin W. Barker was elected vice-president in charge of engineering.

Curtiss-Wright Corp., Metals Processing Div.—**G. I. Sundstrom** has been made assistant general manager, and **John G. Rombaugh** has been named industrial relations manager.

Topp Industries, Inc.—**Peter H. Stanton** has been elected vice-president and treasurer.

H. M. Harper Co.—**James B. Carse** has become marketing manager.

Pittsburgh Plate Glass Co., Paint & Brush Div.—**Harold H. Hill** was named general manager of automotive finishes.

Johns-Manville Corp.—**C. George Dandrow** has been appointed vice-president for customer relations.

Westinghouse Electric Corp.—**Romus Soucek** has been named manager of defense products for the West Coast, and **George B. Meyer** has been chosen to fill a similar post in the Dayton, O., office.

(Turn to page 150, please)

E. W. Bliss Co., Rolling Mill Div.—George Baillie, Jr., was appointed sales manager.

Curtiss-Wright Corp., Metals Processing Div.—Melvin Isaacson is now general sales manager.

Necrology

Adolph W. Machlet, 90, chairman of the board of American Gas Furnace Co., died Sept. 27, at Elizabeth, N. J.

Irving T. Bennett, 55, chairman of the board of General Cable Corp., died Oct. 3, at Irvington-On-Hudson, N. Y.

Richard F. Deimel, 74, retired head of the Mechanical Engineering Dept. of Stevens Institute of Technology, died Sept. 28, at North Adams, Mass.

Harold B. Stone, 65, retired manager of lubricating sales for Atlantic Refining Co., died Oct. 2, at Philadelphia, Pa.

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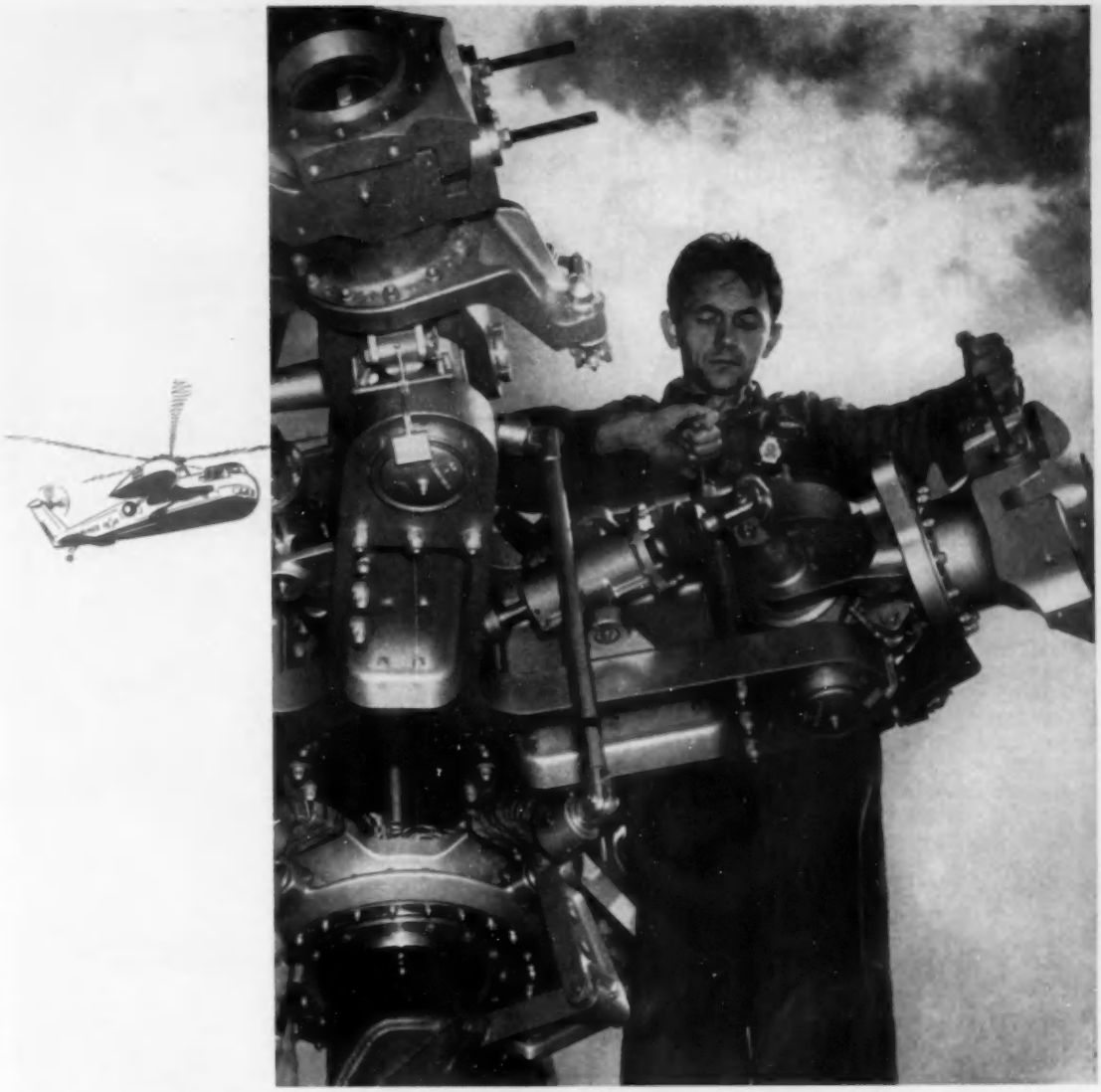

Sikorsky rotor heads stress ESNA

A 16-year fastener field test

How many different stresses are exerted on this rotor head as it controls the cyclic and collective pitch of the five main blades of the Sikorsky S56 designed to transport 26 fully equipped troops? Since it also transforms engine power into forward motion or vertical flight, the stresses add up to an interesting but complicated problem in dynamics. Notice that Sikorsky has solved the fastening problems related to this rotor head design with dozens of standard hexagon and double hexagon Elastic Stop nuts.

They are self-locking, maintain precision adjustments and assure fastener security under the vibration and stress loads normal to helicopter flight.

Sikorsky Aircraft Company had been using Elastic Stop nuts for over a decade before it began developing rotary wing aircraft in 1939. They have been a steady ESNA customer for 27 years and Elastic Stop nuts have been a standard fastener on every new Sikorsky design.

If you recognize the practical value of almost three decades of "flight tested" experience on all types of air frames and engines . . . you'll rely on Elastic Stop® nuts.

ELASTIC STOP NUT CORPORATION OF AMERICA

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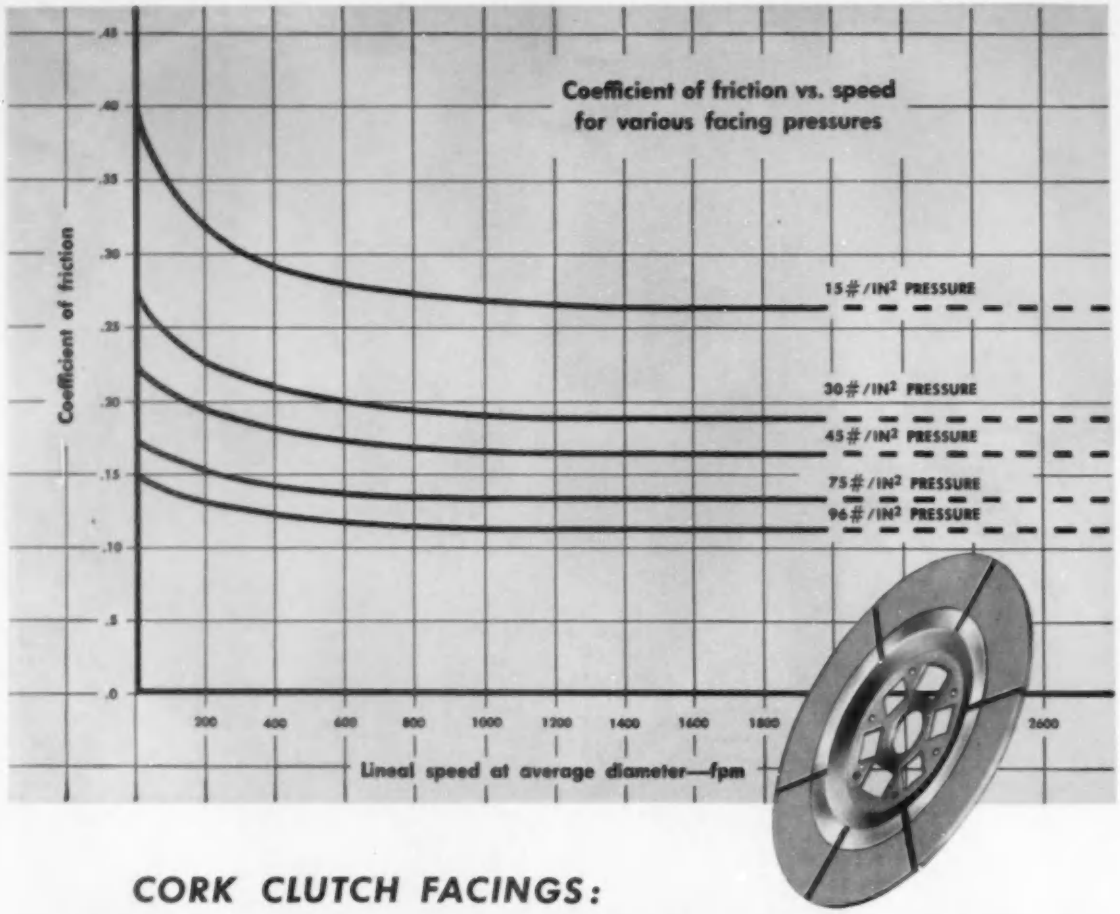


CORK CLUTCH FACINGS:

High torque capacity at low engagement pressures

The curves above show how a typical cork-compounded clutch facing delivers high coefficients of friction under engagement pressures ranging from a low of 15 psi up to 96 psi.

The ability of cork to work efficiently at these low engagement pressures has helped many clutch manufacturers get high torque capacity at low cost—and eliminate wear and improve engagement. In automotive transmissions, for example, various cork plates are used under unit pressures of 20 psi to about 150 psi with excellent results.

Cork's versatility also enables designers to get just the engagement characteristics and torque capacity they need for specific applications. For example, the performance curves shown above can be varied—even reversed—by using unslotted plates, or by using waved plates. This flexibility gives designers wide freedom in clutch design which is of value whether their goal is cost reduction or performance improvement.

Perhaps the most surprising thing about cork is how long it lasts. As a matter of fact, Armstrong-compounded facings in the automatic transmissions of 13 American makes of automobiles normally outlast the cars themselves.

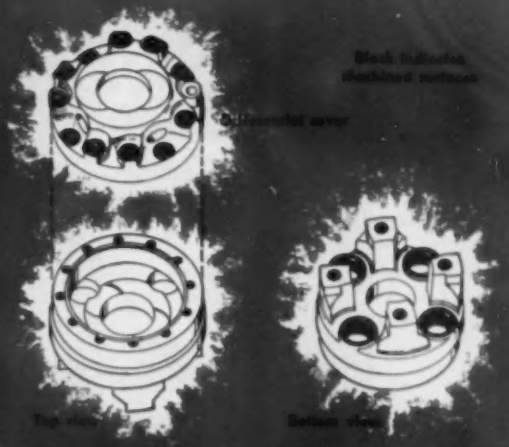
If you'd like to know more about cork facings, get in touch with Armstrong today. Write for your copy of our new 16-page illustrated booklet, "Resilient Friction Materials." Armstrong Cork Company, Industrial Division, 7210 Imperial Avenue, Lancaster, Pennsylvania.

Armstrong FRICTION MATERIALS

. . . used wherever performance counts

CUSTOMER SPECIFIED

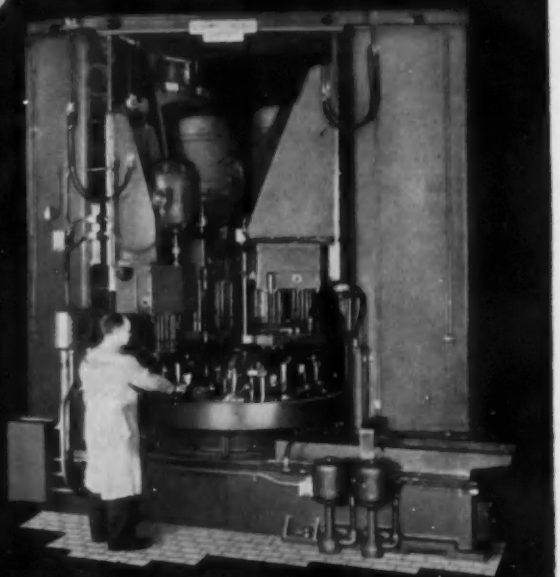
Customer specified a multi-purpose production machine to perform 11 operations in sequence on both the main casting as well as the cover of a differential housing.



KEARNEY & TRECKER DESIGNED

Kearney & Trecker designed this new 88-spindle drilling and tapping machine to complete 134 pieces per hour, 67 covers and 67 main castings.

Machine features rugged columns which provide rigid support . . . and exacting accuracy. Five fixtures, each holding three workpieces, are mounted on a standard Kearney & Trecker 60" rotary index table. Machine employs three vertical drilling heads, each counterweighted. First head has 48 spindles and performs drilling, counterboring, flat bottom drilling and chamfering. Second head carries 28 spindles and handles spotfacing, reaming, boring and trepanning operations while head No. 3 with 12 spindles does tapping operations.



New production efficiency starts with Kearney & Trecker Milwaukee machine tools

This new machine proves that you can rely on Kearney & Trecker's Special Machinery Division to give you the highest production possible at lowest cost. Because with more than 50 years' experience in machine design and manufacture, Kearney & Trecker Corp. has all the ingenuity and skill required to solve high production machining problems.

Why don't you take advantage of our abilities? They can pay off in profits for you. Your Kearney & Trecker Special Machinery Division representative will be pleased to give you all the details. Contact him today!

For more details on the machine illustrated ask for Data Sheet No. 1052. Also, free booklet "Doorway to a proven method for solution of big and small metalworking problems" is yours for the asking.

KEARNEY & TRECKER MILWAUKEE MACHINE TOOLS

Special Machinery Division

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Builders of Precision and Production Machine Tools Since 1898

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FOR *faster* RADIAL

DRILLING AND TAPPING

■ Hammond Radial Drilling and Tapping Machines may be spotted in the production line for drilling, tapping or reaming. With its unique Bracket Type construction the spindle can be swung quickly from hole to hole. Six Quick Speed Changes are instantly available and the Hammond Tapping Reverse is very fast and convenient to operate.

THE FOOTE-BURT COMPANY

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engineered for production

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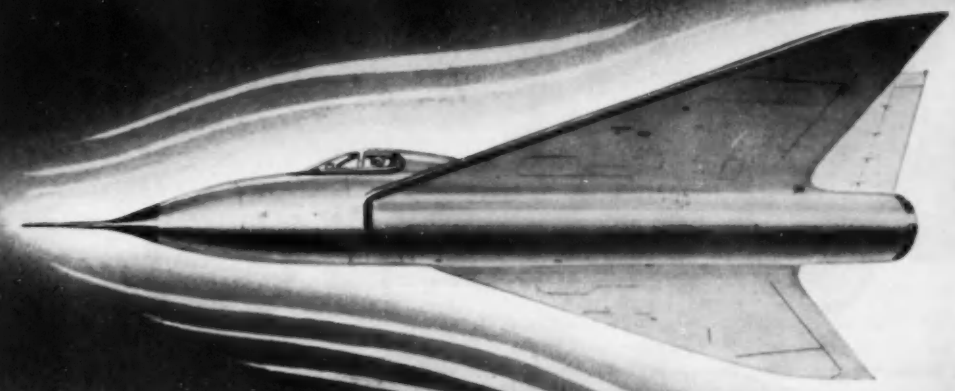
MACHINE TOOLS

ARO *Vision-eering Leads*
IN OXYGEN EQUIPMENT



20 LITER CONVERTER

5 LITER CONVERTER

ELECTRICAL TRANSDUCER GAGING SYSTEM

An IMPROVED means for measuring contents of Liquid Oxygen Converters . . . provides a continuous sight-reading of amount of liquid oxygen remaining in a converter.

ARO Liquid Oxygen Converters save space and weight . . .

make one tank of liquid do the job of many tanks of gaseous oxygen! This important forward step in oxygen supply is another ARO *first!*

In the specialized sphere of oxygen equipment and components for high altitude flight . . . aviation looks to ARO for leadership!

ARO research and development have pioneered and perfected many of the new products to control the vital oxygen supply for the men who fly "way upstairs." Leading aircraft makers depend on Aro for a growing number of precision products. For further details write:

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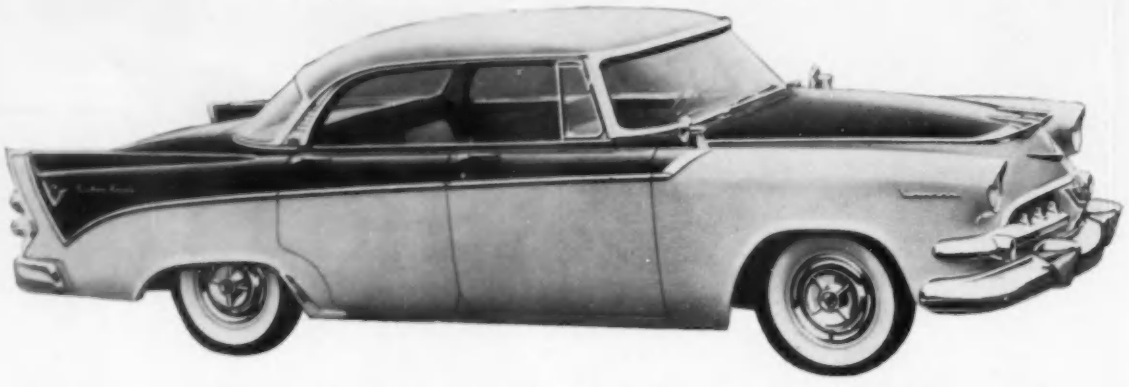
Liquid Oxygen Converters, Oxygen Regulators, Pressure Regulators, Contents Gauges, Relief Valves, "Anti-G" Valves, Air and Oxygen System Accessories, Actuating Cylinders and other Aircraft Accessories.

Dodge *Adds Larger V-8 Engine to Line*



Four-door Lancer hardtop. While this car is in the Custom Royal series, the same body style is offered in the Royal and Coronet series

NEW styling, greater power, and improved getaway from standing starts distinguish the new Dodge cars for 1956.

Four separate series comprise the 1956 line of Dodge cars: Coronet, offering four-door sedan, club coupe, four-door Lancer hardtop, Lancer hardtop and Lancer convertible; Royal V-8, offering four-door sedan, four-door Lancer hardtop and Lancer hardtop; Custom Royal V-8 with four-door sedan, four-door Lancer hardtop, Lancer hardtop and Lancer convertible. Finally, a new station wagon line offers a wide choice of seven two-door Suburban and four-door Sierra models.

Both the Coronet and Suburban lines allow the customer a choice of Dodge Get-Away Six or Dodge V-8 engines in certain body types. Selection between Red Ram V-8 and Super Red Ram V-8 is also available in the Suburban and Sierra lines.

The completely new Super-Powered Super Red Ram V-8 develops 230 hp. This optionally-installed power plant is especially equipped with a four-barrel carburetor, dual exhaust system, special manifolding, distributor with special spark-advance curve and a vibration damper. It is available in all Dodge V-8 model series.

The new Super Red Ram V-8 in the Royal and Custom Royal lines has horsepower upped to 218, and torque markedly increased.

All of the 1956 Dodge engines use a new 12-volt electrical system.

An improved and more powerful version of the Red Ram V-8 engine is offered for the Coronet line.

A Dodge Get-Away Six in-line type engine is available in certain models of both the Coronet and Suburban lines. It has achieved higher power and torque through a cylinder head revision which raises the compression ratio to 7.6 to 1.

The new Super Red Ram V-8 engine has a unique single-rocker valve train and a newly designed polyspheric combustion chamber. Displacement has been increased to 315 cu in. by lengthening the stroke to 3.80 in., while thermal efficiency has been improved by increasing the compression ratio to 8.0 to 1. Increased thermal and volumetric efficiencies at lower speeds are said to make available more torque for improved performance in the speed ranges most often encountered in everyday driving.

The 1956 Dodge incorporates a new 12-volt electrical system, with improvements in all components. New design spark plugs are claimed to give a substantial increase in fuel economy and cost less to maintain.

One of the most advanced body features is the new safety door latch, introduced for use with Dodge's exclusive self-tightening rotors, which minimizes possibility of doors flying open under crash impact.

Cars equipped with PowerFlite have the new push-button drive selector used on 1956 Chrysler Corp. cars. Located on a projection of the instrument panel at the left of the steering wheel, this new drive selector is removed from the possibility of accidental interference by front seat passengers, especially children.

Power brakes available for all Dodge cars equipped with the PowerFlite transmission are completely new in design. The vacuum-operated power unit supplies a power assist to the brake pedal linkage in the ratio of 2.5 times the brake pedal mechanical advantage.

Custom Royal Lancer V-8 convertible

The easier action lowers pedal pressure required for stopping without power assistance. For instance, where it might require a pedal force of 20 lb to stop the car with the power brake, only about 30 lb are needed without power assistance.

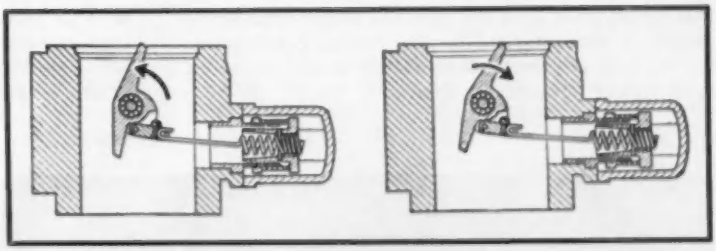
An automatic car record player, operating through the car radio, gives 45 minutes to an hour of uninterrupted music on each side of the seven-inch records.

Coaxial power steering, improved PowerFlite automatic transmission, a car heating system and the Airtemp car air conditioner are a few of the driving and comfort aids continued for 1956 Dodge cars.

• • •

New Gas-Inertia-Type Engine Governor

A NEW governor which limits the speed of the engine in accordance with the inlet-manifold vacuum or the inertia of the stream of mixture entering the manifold has been developed by Deutsche Vergaser Gesellschaft of Neuss-on-Rhine, Germany. The dynamic pressure of the gaseous current on the throttle disk tends to close the throttle, while a tension spring tends to open it. As shown in the accompanying drawings, the throttle disk, instead of being plane, is slightly bent around its axis, and the axis is offset from the center of the disk. The throttle disk is free to rotate on its axis between limits, and even at full throttle is slightly inclined to the direction of flow, so that the gas pressure on it tends to close it. If the throttle lever located outside the throttle housing is set for maximum opening, the throttle disk follows under the influence of the governor spring. On the other hand, if the throttle lever is moved to the idling position, the throttle disk is carried along. With the lever in the idling position the throttle is opened by the governor spring until the unbalanced dynamic pressure on the disk is equal to the tension of the governor spring. The view on the left, in the illustration, shows the motion of the throttle disk around its axis when the gaseous pressure on the disk is smaller than the spring force, while the view on the right shows the direction of throttle motion when the gaseous pressure on the disk exceeds the spring force. The anchorage point of the spring can be moved to the right or left by a screw adjustment, and the governed speed of the engine changed at will.



Sectional views of the governor; at left, gaseous pressure on disk is less than spring force; at right, gaseous pressure exceeds spring force

FORD'S *New* Continental the Mark II

This view shows how molding is stamped into rear deck lid to provide space for spare tire

THE Continental Mark II, Ford Motor Company's new luxury car, is a modern version of the Lincoln-Continental. Use of the "Mark II" designation, a departure from the practice of identifying American-made cars by model year, is based on the assumption that the Lincoln-Continental produced between 1940 and 1948 constituted the Continental "Mark I" series. Such a designation will serve to emphasize the basic body design of the Continental rather than a model of any particular year.

Believed to be the lowest of American production cars with both a front and a rear seat, the Continental Mark II is only four feet, eight inches high. This height has been achieved, without sacrificing headroom, with a unique modified ladder-type frame which is characterized by the tubular construction of its crossmembers. This design is said to afford exceptional torsional rigidity.

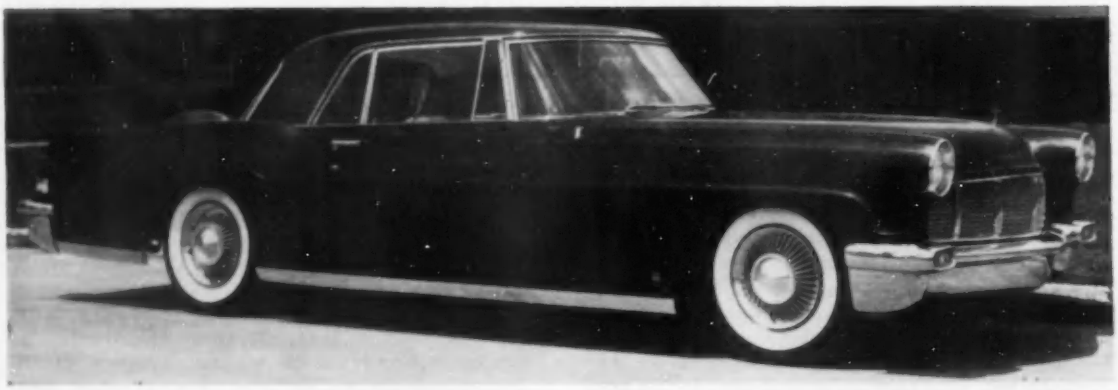
The Continental Mark II is a two-door hardtop coupe, available in 14 exterior colors and five two-tone combinations. The only optional feature is air conditioning. Among standard features are the automatic transmission, power brakes and power steering, and power-operated vent, side and rear-quarter windows. Window and seat controls are set into the arm rest at the left of the driver, while individual window controls are convenient to each passenger.

The engine is an overhead-valve, V-8 of 368 cu in. piston displacement. Bore is 4.00 in., stroke 3.66 in., and compression ratio is 9.0 to 1.

An automatic transmission of the torque-converter type is standard equipment. Its ratios are: first—2.4; second—1.467; third—1.0; and reverse—2.0.

Power steering is of the recirculating ball type with an overall ratio of 22.1 to 1.

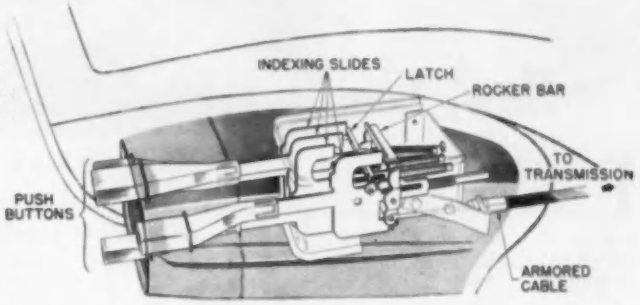
Wheelbase is 126 in., overall length 218.4 in., overall width 77.5 in., and overall height 56 in. Tread is 58.5 in. front and 60 in. rear.



The Continental Mark II retains some of the characteristics of the former Lincoln-Continental, including a long hood, short rear deck, distinctive rear roof quarter, and compact passenger compartment.

This Fireflite convertible shows the sweeping lines of the 1956 cars

'56 DeSoto Engine Has Same Bore, Longer Stroke



Phantom illustration of Powerflite push-button control on the instrument panel

STYLING and mechanical refinements mark the 1956 De Soto passenger car line. Both the Fireflite and Firedome engines, with a displacement of 330.41 cu in. compared to 290.8 cu in. in the previous model, develop more power and torque.

The larger displacement was obtained by increasing the stroke to 3.80 in. from 3.34 in. Bore remains the same at 3.72 in. Compression ratio in the both new engines is 8.5 to one, up from 7.5 to one. Horsepower of the Fireflite has been raised from 200 to 255 at 4400 rpm. Horsepower of the Firedome is now 230 raised from 185.

A number of interesting mechanical improvements are to be noted. Control of the Powerflite automatic transmission is through push buttons mounted on the instrument panel at the left side of the steering column. This control prevents shifting into reverse at speeds above 10 mph. The Powerflite transmission is standard equipment on Fireflite models and optional equipment on Firedome.

Major changes have been made in the braking system. Twenty-five per cent greater braking surface is provided by the new floating shoe center plane brakes with 12 in. diam and 2½ in. width shoes. The system is designed to require no major adjustments for the life of the brake. Power brakes are completely new in design, supplying power assist of 2½ times the brake pedal mechanical advantage.

Other changes in the chassis components include a new larger propeller shaft on Firedome models, with ball and trunnion front universal joint and cross type rear universal joint. Wheels have been strengthened by omission of chain slots. On the engine, the water

(*Turn to page* 121, *please*)

Crisp grille treatment is emphasized in this view of a Fireflite four-door sedan

The new Imperial is 5½ in. longer than last year's car

New, Longer Imperial Has 280-Hp Engine

FEATURING a new FirePower engine which delivers 280 hp, the 1956 Imperials are 5½ in. longer than the models of last year, with a wheelbase of 133 in.

Record player which provides up to 45 minutes of uninterrupted music from one side of special seven-inch records

A wider choice of body models is available with the introduction of a new four-door hardtop which features a full-sedan body, full-sedan roof, full rear headroom and legroom, full-width rear entrance space, and full side vision for rear passengers.

In addition to an improved PowerFlite transmission, standard on all Imperials, the automobile features as standard equipment a four-way power seat, power window lifts, variable-speed electric windshield wipers, automatic interior lights, torsion bar deck-lid counterbalance, and a new self-regulating electric-mechanical clock which automatically compensates for its own error every time it is set.

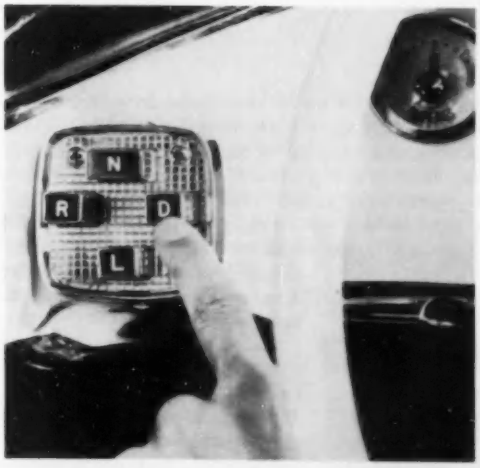
Push-button drive is featured on all cars. Located to the left of the steering column, the four push buttons are arranged on a small panel and have an automatic lock-out to prevent accidentally changing to "reverse" range at over 10 mph.

Imperial's trademark, its gun-sight tail lights, are mounted above the rear fenders. Back-up lights, outer bumper extensions and the gas-filler door are blended integrally into the rear edge of the fenders. The high-rising line of the rear fenders is accented, by contrast, with the slim, tapering molding which starts at the back-up light and extends forward along the full length of the car.

(*Turn to page* 114, *please*)

1956 Chryslers *offer* Greater Power *and* New Styling

Chrysler New Yorker which is powered by a 280-hp engine



Pushbutton control for PowerFlite drive

THE 1956 Chryslers are offered in two lines — the Chrysler Windsor and the Chrysler New Yorker. Wheelbase measurement of all cars is 126 in.

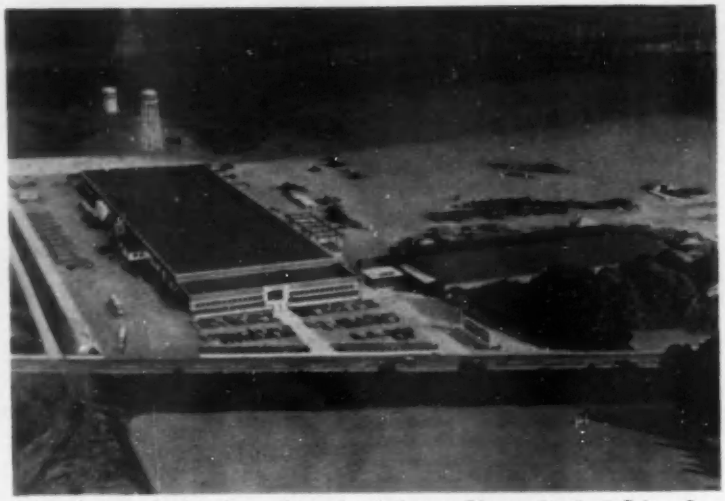
The Chrysler Windsor is available in a completely new four-door hardtop, six-passenger sedan, Nassau hardtop, Newport hardtop, convertible coupe and the Town and Country Wagon. The Chrysler New Yorker line includes a new four-door hardtop, six-passenger sedan, Newport hardtop, St. Regis hardtop, convertible coupe and Town and Country Wagon. Chrysler's 1956 hardtop and convertible models are five inches longer than last year.

The PowerStyle Chrysler Windsor and PowerStyle Chrysler New Yorker models feature new Pushbutton PowerFlite drive, new 12-volt electrical system and new

(*Turn to page* 110, *please*)

1956 Chrysler Windsor

Custom Building of Heavy-Duty Truck Chassis

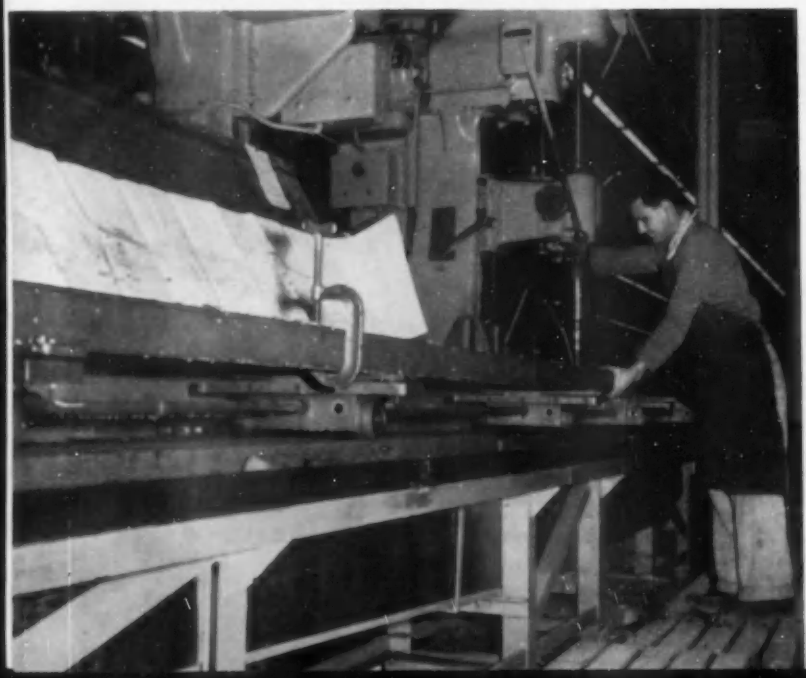


Autocar's new plant and warehouse located on a 54-acre tract at Exton, Pa.

PROBLEMS of designing efficient production into new facilities are just as real to the relatively small custom builders as they are to the giants of the industry. Autocar Div. of White Motor Co. offers an interesting illustration of what can be accomplished by ingenuity and careful planning. The company is now installed in its new factory and offices at Exton, a few miles west of its original home in Ardmore, Pa.

The new $2 million plant covers 130,000 sq ft on one floor, with an additional 12,500 sq ft of office space. To keep trucks flowing to each customer, Autocar must build several types at one time. Under this system the plant will handle about 15 completed chassis per eight-hour day. All shipments to and from the new facility are by truck. Loading docks run almost the entire length on both sides of the building.

Frame rails are mounted on a roller table for drilling.



Autocar manufactures heavy-duty truck chassis. Most orders call for special features to suit the particular requirements of the customer. The company builds over 20 standard models which are seldom ordered without some modification. Starting from these the customer can select from about 10 engines, 20 transmissions, 20 rear axles, and eight standard frame lengths as well as any custom length. Then he usually specifies the type and location of accessories, controls and other equipment. Scheduling, therefore, is a considerable problem.

As the result of a concerted make-or-buy study in the early planning stage, Autocar does substantially less manufacturing than it did formerly. This

Assembling the cab on its individual dolly. Frames of aluminum or steel can be welded on same subassembly jig.

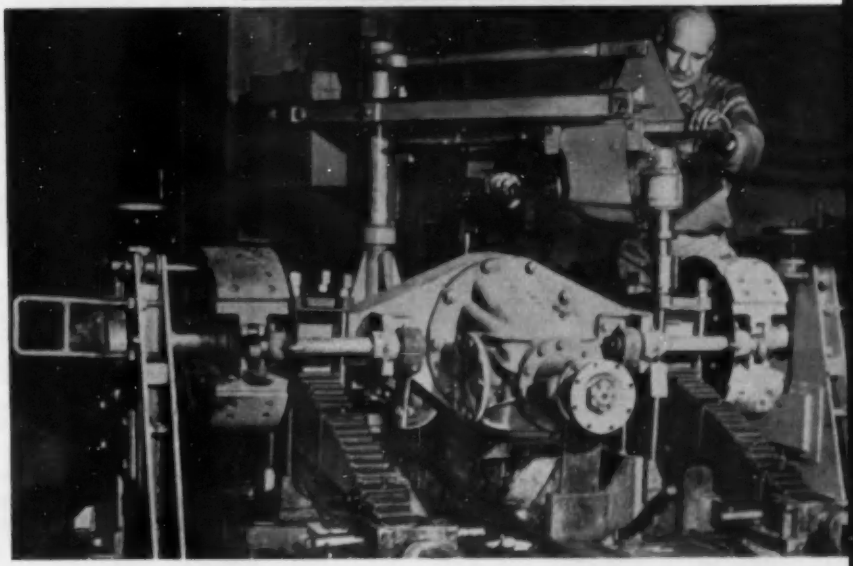
Picture Below—
Painting the finished cab. The dolly rolls along a track to a hydraulic lift, which rotates for ease of painting.

Bottom Picture—
Jig for assembling rear springs to the axle. It automatically aligns the springs to the axle housing, and compresses them for free run-down of the nuts on the clips. Air wrench sets predetermined torque.

change has produced considerable savings. The White Mustang gasoline engine is used in place of the engine Autocar made at its former plant. A large portion of the machined parts Autocar once made are obtained from White in Cleveland or purchased from vendors. Castings are still finish-machined in the new plant. Blacksmith-type parts such as U-bolts and fender braces are another Autocar specialty. Seats are fabricated, as are wiring harnesses for instrument panels.

Production begins with drilling of frame rails which are prime painted as received. The operator lays out his own work for each piece, as the variety required does not make templates feasible. Rails are rolled to the line, where cross member castings of iron or aluminum are bolted together. Components are fed in to the line from easily loaded and unloaded parts bins; parts are received from White already loaded on pallets.

The line itself is at floor level for cleanliness and safety, and the chassis frame rolls upside down on dollies. A unique machine aligns the rear springs on the axles and compresses them so that U-



bolts are run up free. The frame is rolled right side up for completion.

After the engine is installed and the drive line hooked up, the engine is started up for a check of oil and air pressure, and of the transmission and axles. A portable fuel and ignition truck facilitates this operation. Then the line runs through a Binks water-wash spray booth where the chassis and fenders are finish-painted. Infra-red drying follows.

Three types of cabs are Heliarc welded from steel or aluminum stampings, channel and sheet materials for the cabs are purchased outside. Only difference in cabs of the two metals is in the corner post castings and in the gage of the metal. Finished cabs are fed into the line from the side and installed. Assembly work generally is of a skilled nature, as each worker reads the order sheet accompanying the chassis and picks up the variations in his portion.

An elaborate Metalwash sheet metal finishing setup provides a phosphate coating on fenders, running boards, exhaust tubing and similar parts. The conveyorized equipment operates on two levels under the 20-ft ceiling.

An overhead trolley crane and switch arrangement lifts the completed chassis off the dollies and places them two abreast at the end of the line. Final inspection and adjustment take place in a minimum area. The truck may be run through the touch-up spray booth near the exit.

Materials handling is simplified in the straight-line assembly line, with stores held as close as possible to the using area. Maximum air space is used.

Steering gears of various sizes are stored on roller conveyor racks which are filled from aisles, emptied at assembly point.

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Vehicle Market in Canada Seen As Promising by AMC

As in the U. S., a continued growth is foreseen for the automobile and truck market in Canada. Speaking before the Federation of Automobile Dealers Associations of Canada, George Romney, American Motors president, predicted that Canadian motor vehicle registrations will soar to 6.5 million in 1965, nearly double the 1954 level. A $26 billion gross national product is forecast for Canada during the 1955 to 1956 period.

Concerning AMC's future in the Canadian market, Romney forecast that car and truck sales should reach in the neighborhood of a half million units by 1965. This compares with the current annual rate of 350,000 units. The Canadian Automobile Association has high hopes that the 10 per cent excise tax on cars will be removed next year. Earlier this year, the Canadian government cut excise taxes by five per cent on passenger cars.

Mechanical Innovations and Restyling

To Mark 1956 STUDEBAKER-PACKARD LINE

STUDEBAKER-PACKARD CORP. will offer some interesting innovations in its 1956 models which were shown to the press at Detroit on September 27. According to the company, Packard will have the highest horse power and torque in the industry, although no specific figures were given.

New Packard developments for 1956 include a "non-slip" differential, electric pushbutton control for the Ultramatic transmission, and reversible seat cushions and backs for the Caribbean. They give owners a choice of leather or fabric upholstery by merely turning over the seats or backs.

In line with previous plans, the Clipper and Packard lines will be further divorced. The name Packard henceforth will not appear on the Clipper car. All that can be revealed at present engine-wise, is that the Clipper will have the 352 cu in. V-8 engine used on the Packard in 1955, and the Packard line will be powered by a larger 374 cu in. V-8 power plant. Torsion bar suspension will be standard equipment across both the Packard and Clipper lines, but it will be an extra cost option on the lowest priced Clipper.

Another interesting feature will be a 2.87 axle ratio, lowest in the industry, which will be a no-cost option on both lines of cars. This will give fuel economy comparable to a standard transmission with overdrive, according to Packard engineers.

The "non-slip" differential, designed to transfer torque to one rear wheel if the other has no traction, will be offered as an extra cost item. Another interesting option will be electric door locks controlled by a master pushbutton on the instrument panel. It involves the use of solenoids to actuate the regular door latch mechanism. All four doors are locked by the device, but it is possible to override front door locks mechanically.

From a style viewpoint, Packard has revamped grilles and exterior molding treatment and has redesigned the tail lights. Dual exhaust ports now are built into the bumper guards.

Studebaker has done a major restyling job short of a new body. The European look with sharply sloping front and rear appearance is gone to be replaced by higher and more massive grille, hood, fenders, and rear deck. The car now much more closely resembles a standard American automobile in styling.

Studebaker will have three series—the Champion, Commander, and President—plus a new sports car series comprising the Golden Hawk and Power Hawk. The latter cars still retain some of the previous Studebaker styling and are powered with the Packard

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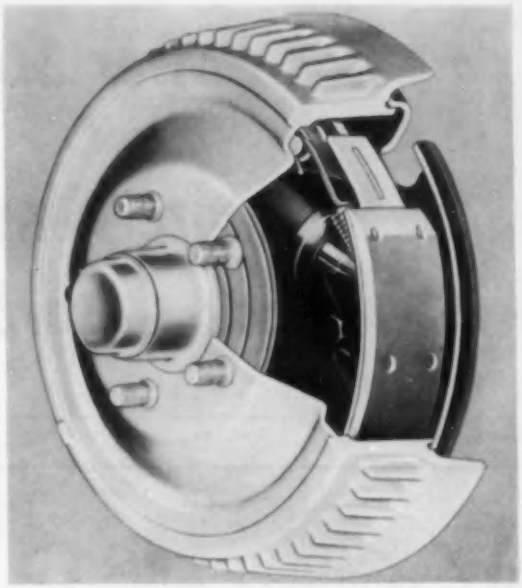
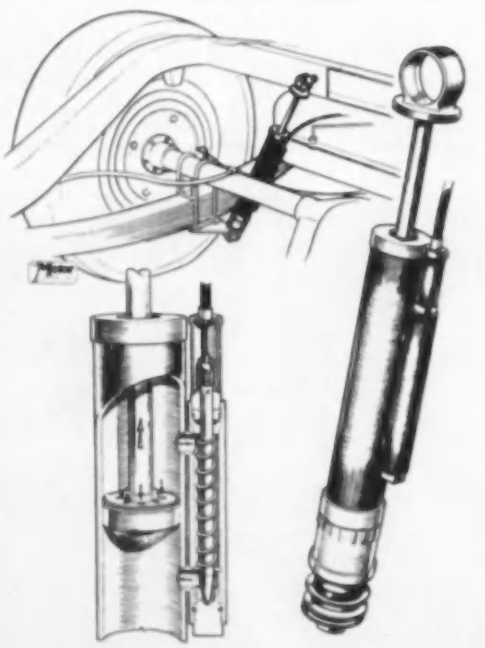


Finned brake drum to be used on the brakes of the 1956 Studebaker President models and Golden Hawk sports type cars provides increased surface area and greater air circulation.

Console control for the electrically activated push-button automatic transmission to be offered on 1956 Packard models is located on steering column for easy accessibility. Special "Park" lock prevents disengagement without opening ignition circuit with key.

1956 Armstrong-Siddeley Sapphire Has Power Steering and Remote Control Shock Absorbers

At right—linkage-type power steering unit made by Girling. The ball stud assembly carried on the cylinder as adapted for the A-S Sapphire linkage is not shown.



Telaflo shock absorbers at rear axle have a valve-operated by-pass for the fluid attached to the side of the unit. Operation of the valve is by remote cable control. Illustration courtesy of The Motor, England.

COVENTRY, ENGLAND

POWER-ASSISTED steering is used for the first time in a British car in the 1956 Armstrong-Siddeley Sapphire. The linkage-type unit is made by Girling, and is integral with the valve assembly. The steering drop arm is attached to the valve spool which is positioned in its bore by a single reaction spring. At pressures above about 3 lb on the steering wheel rim (amounting to 75 lb on the valve), the spool moves and admits fluid, through channels cast into the valve body, to one or the other side of the 1½-in. diameter actuating cylinder.

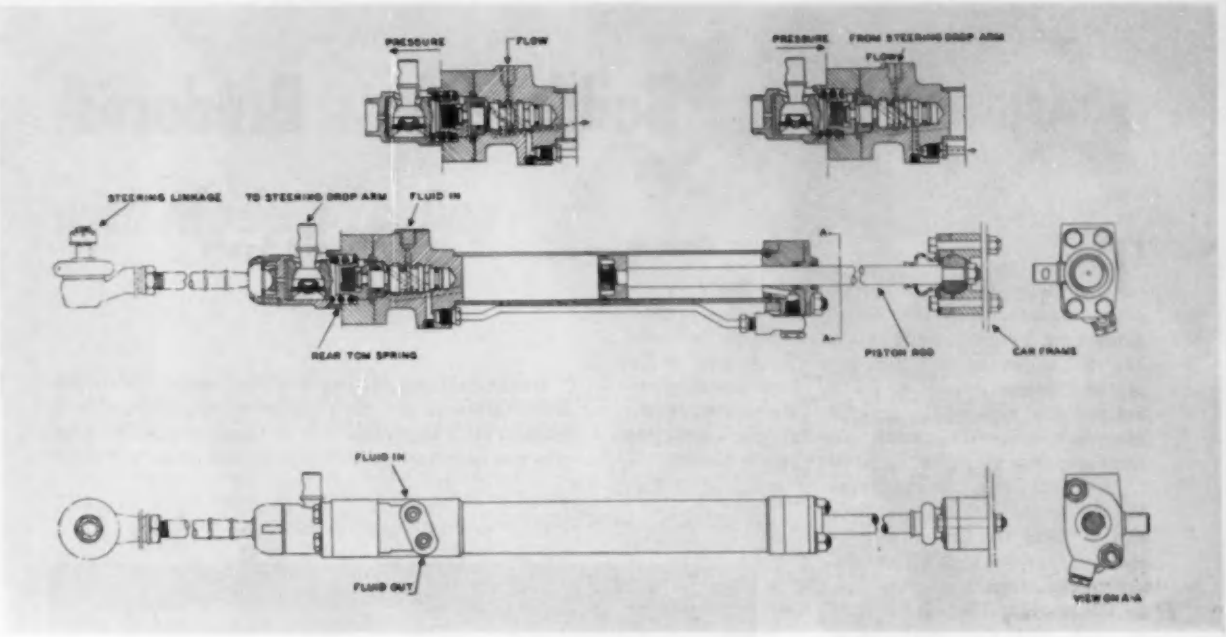
Spool movement is extremely small, and it is stated that it causes no noticeable increase in steering backlash. Reaction areas of the valve are designed so as to require progressively greater steering effort in order to increase assistance.

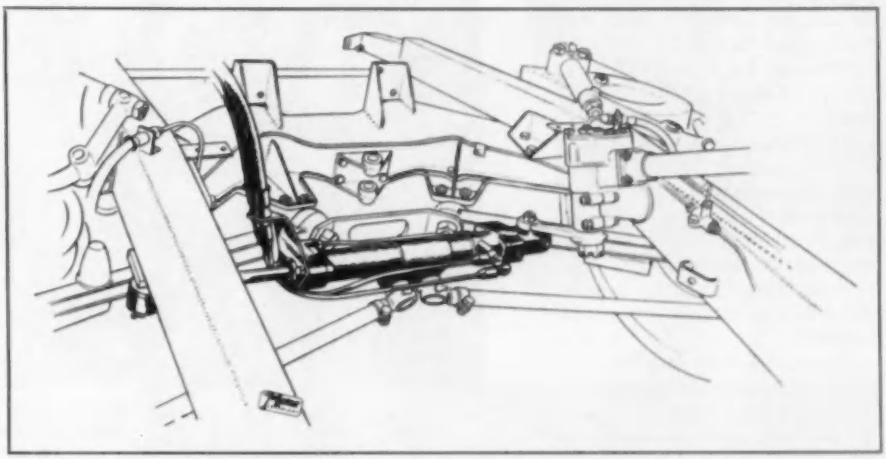
A rotary type pump is driven from the crankshaft pulley. It incorporates a built-in flow-control valve, limiting pressure to 600 psi, and a reservoir.

The Sapphire installation includes a dashboard control for regulating the degree of power assistance. This operates an additional valve in the pump circuit which restricts the fluid bow to the steering unit, by-passing it to the pump inlet.

Maximum recommended stroke of the piston is 12 in. Girling also make a 15-in. stroke model which has a 2¼-in. diameter cylinder.

Another feature of the Sapphire is the adjustable ride control shock absorbers on the rear wheels. These are made by Telaflo, an associate of Universal Dampers. Of telescopic design, they include a by-





Arrangement of power steering components on the Sapphire. Illustration courtesy of The Motor, England.

pass valve connecting ports in the main cylinder on each side of the piston. The lower port is closed by a spring-loaded tapered rod whose position, and therefore the size of the opening and amount of bleed, is controlled from the driver's seat by a flexible cable.

Ports are centrally positioned and spaced 4 in. apart along the 8-in. cylinder. This location serves to override the by-pass valve should a large bump or hole be struck with the control at "soft." When wheel deflection exceeds these limits, the appropriate port is sealed off by the piston and the full resistance of the unit damps the shock at these extremes of travel.

Plymouth Taxicab Offered As Separate Line Of Cars

Plymouth is the first major automobile company to offer a new type of taxicab as a separate line. The cab will be completely equipped, except for a meter and roof sign.

It will include as standard equipment such items as heavy-duty generator, special interior trim, and open door warning signal. In the past, taxicab companies had to install special equipment on the vehicles after receiving them from the factory.

Oldest Engine Builder Mass Produces

COLOGNE, GERMANY

By David Scott

THE claim that Klöckner-Humboldt-Deutz is the oldest manufacturer of internal combustion engines dates back to 1864, when Nikolaus August Otto and Eugen Langen set up the firm of N. A. Otto & Co. in the Cologne suburb of Deutz. Together they developed the atmospheric engine, fore-runner of the modern four-stroke machine, and five years later the workshop was moved to the present site in Cologne.

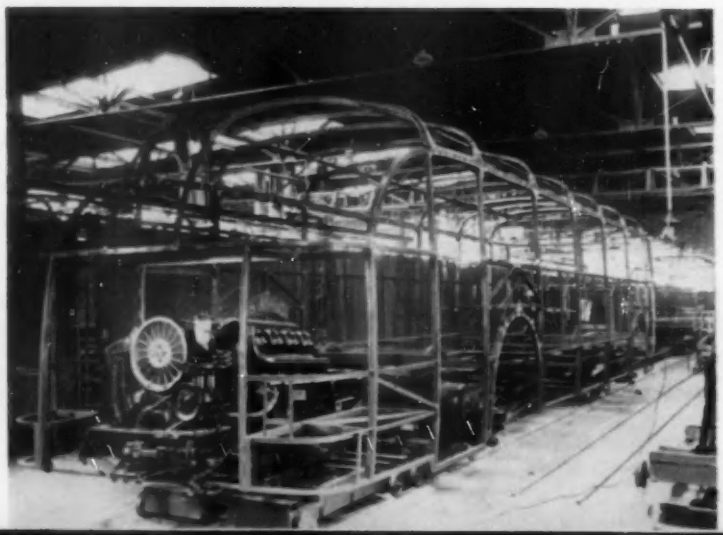
In 1872 the Gasmotoren-Fabrik Deutz AG was formed, and by 1876 the first pressure-charged four-stroke engine working on the "Otto cycle" was put on the market. This was a four hp unit with slide valves and flame ignition. By the time Otto died in 1891 over 30,000 engines using his principle were in use, and cylinder output had been raised to 100 hp.

The next big milestone in the history of this German company came in 1912 when it launched the first Diesel engine with solid fuel injection. Thus Deutz was also the commercial pioneer of compression-ignition, although it had little to do with the original work of Rudolf Diesel, and, in fact, turned down his engine when he first offered it to them in 1907.

Production grew rapidly, and subsequent mergers greatly enlarged the manufacturing capacity and range of products. In 1930 Deutz was joined by Humboldt, which specializes in heavy machinery and steel structures. The Magirus Works in Ulm, making trucks, buses and fire engines, joined the group in 1936. Until 1937 Deutz was the largest producer of Diesel engines in the world.

Klöckner-Humboldt-Deutz is best known for its air-cooled Diesels, the development of which started in 1935. Full scale production of these, started in 1942, was geared to the needs of the German army for heavy

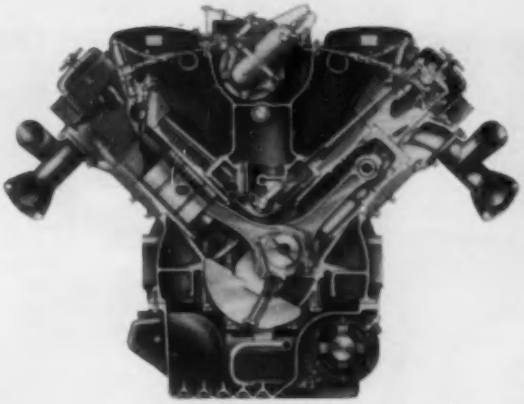
Assembly line for Magirus truck chassis. Output includes 5-, 7- and 9-ton vehicles powered by 4-, 6- and 8-cylinder air-cooled Diesels.



Assembly of integral coach bodies at Ulm. The rear-mounted V-8 Diesel will be sound-proofed by foam rubber lining of its compartment.

Aircooled Diesels

with Modern Tooling

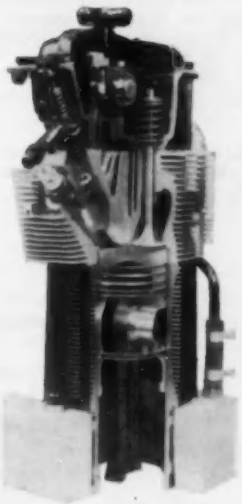


Section of the Deutz V-type engine, built in 6, 8 and 12 cylinders. Power ratings are 110, 145 and 220 hp at 2000 rpm.

military vehicles to operate in the desert during the North African campaign. As post-war acceptance of air-cooling grew, Deutz concentrated increasingly on engines of this type.

The present range includes in-line engines of 1, 2, 3, 4 and 6 cylinders, and V-6, V-8 and V-12 units. Since 1948 nearly 150,000 aircooled Diesels have been made, and volume production is achieved by using a number of parts common to all types. Among these are pistons, connecting rods, cylinder barrels and heads, and valve gear. Bore and stroke are 4⅜ in. and 5½ in., displacement is 81.16 cu in. per cylinder, and power output varies from 15 hp for the single cylinder to 220 hp for the V-12.

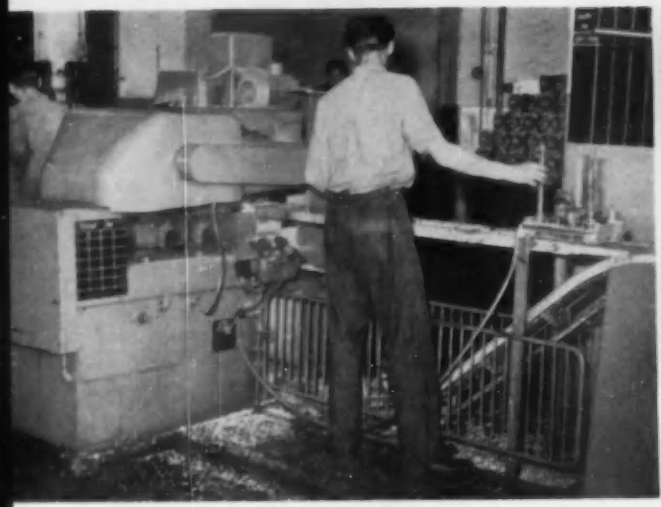
All automotive engines of over three cylinders are made at Ulm, as are the parts shared with the smaller ones turned out at the Cologne factory. A number of automatic setups are used, practically all of which were built by Deutz. The newest transfer line, a six-station machine installed in January, completely machines bearing caps at the rate of 100 per hour. Sets of five integrally-cast caps, clamped in a heavy traveling fixture, are rough and finish milled, drilled, tapped and countersunk. An overhead conveyor returns the empty fixture to the loading station.



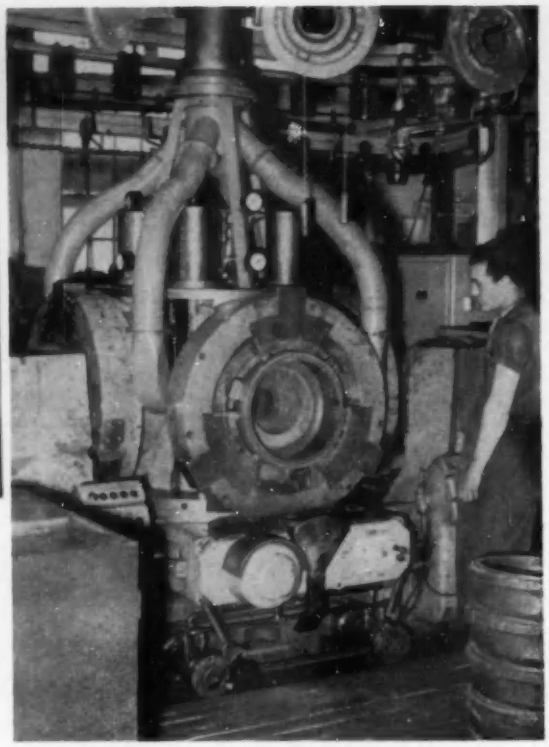
The same cylinder assembly is used for most of the Deutz aircooled Diesels. Bore is 4⅜ in., stroke 5½ in., piston displacement 81.16 cu. in., compression ratio 17.8 to 1

Another transfer line is used for the individual cylinder heads. These complex aluminum castings are bolted to a trolley which is carried on rails past the 13 stations with a total of 26 single- and multi-spindle machines. Repositioning of the work is avoided by using three- and four-head stations into which the trolley is guided transversely on sliding rail sections. Operations include finish boring the valve guide holes and tapping the mounting holes for the fuel injector and glowplug in the cast-in pre-

Small aircooled engines are run for two or three hours in the test bay at Cologne. Painting and packing follow.



At the start of the 13-station transfer line for cylinder heads, fixture is fast-returned by underfloor conveyor to the loading station.



Brake drums for Magirus trucks and buses are faced, drilled and turned on this four-station rotary automatic built by Boehringer.

combustion chamber. Output is about 1000 heads per nine-hour shift.

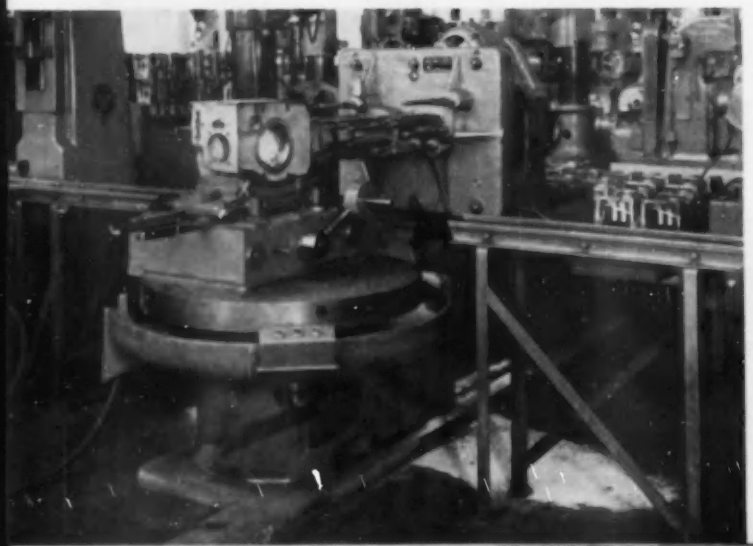
A series of rotary automatics is used for the valve gear. The rocker box, which bolts to the top of each cylinder, is drilled, tapped and milled on a four-station machine in 44 seconds. Another 12-position machine with a 45-second work cycle drills and faces rocker arms. This one was made by Hüller and has 15 spindles. Rocker shaft supports are machined on a smaller seven-station indexing automatic built by by Deutz.

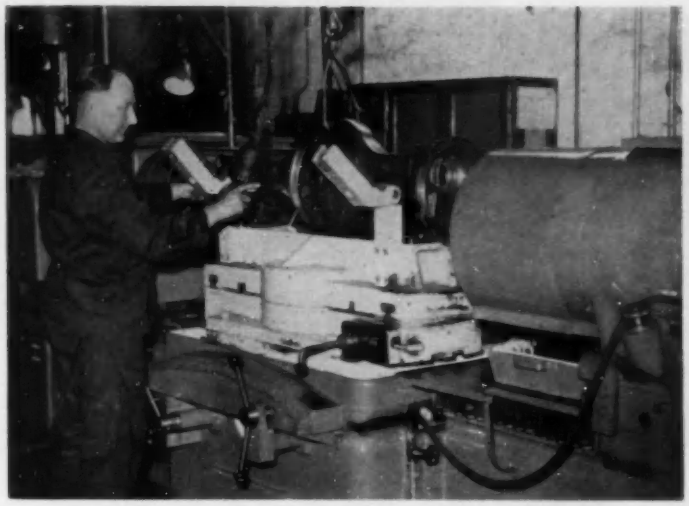
Flow production is used in the crankshaft section. A closed-circuit monorail, overhanging the double-sided machining line, stores crankshafts between operations. An unusual feature of the larger Deutz crankshafts is the C-shaped counterweights which are stretched onto pre-cut notches in the webbing. A special hydraulic expander is placed in the line for this purpose.

Two separate assembly conveyors are used for in-line and V-type engines. An elevator at the end of the assembly lines drops engines to the test room two floors below. Here it is joined by an overhead conveyor running along the center aisle which is flanked by the test stands. There are 20 universal stands which can handle all types of engines.

Magirus trucks and buses are manufactured at Ulm, and several automatic setups are used for axle parts. Brake drums, for example, are faced, drilled and turned on a four-station rotary automatc built by Boehringer. A double-ended Deutz machine drills and faces the mounting flanges of both re-

Multi-spindle station on the single-cylinder engine block line at Cologne. The swiveling track section is offset from the center of the turntable so that two faces can be bored successively by the same head.





Reduction gear housings for the big Magirus truck are drilled and faced on this double-ended machine built by Deutz.

duction gear cases on the banjo housing for the largest truck.

The truck assembly plant was 90 per cent destroyed during the war. While 600 chassis per month have been turned out in the confined quarters of the main factory until recently, a new assembly department has been completed. The installation comprises three parallel lines for the 5-, 7-, and 9-ton chassis. These are all powered by aircooled engines and are of two-axle design with optional front-wheel drive.

Coachwork for the buses is done in an adjacent building. These vehicles feature a rear-mounted engine which is effectively silenced by lining the tail compartment and airscoop on the roof with 1-in. foam rubber. Deutz makes all its own body jigs and panel pressings. A fully-equipped woodworking shop is maintained for pre-fabrication of truck bodies. Conveyors are used extensively to move the wooden parts to assembly areas. In addition, output of fire engines, started by C. D. Magirus in 1864, is the largest of any European manufacturer.

At the Deutz works in Cologne the production program is considerably broader and therefore more emphasis is given to versatility of tooling. Besides large marine and industrial engines up to 2000 hp, the smaller aircooled Diesels in two cylinder sizes are made here. While the big machines are custom-built or batch-produced, considerable mechanization is used on the 1,- 2- and 3-cylinder units, output of which is 3000 per month.

The extensive use of interchangeable multi-spindle heads on machines linked by roller track is typified on the line for 2- and 3-cylinder engine blocks. Similarly, the crankshaft line is set up to machine six different types. Since there is a call for 90 varieties of flywheel, output is speeded by using hydraulic copying attachments on the Schiess vertical boring and turning mills. Local production by Deutz covers a wide range of components, from large crankshaft forgings to complete fuel injectors.

The nearby Kalk factory turns out 60-70 air-cooled tractors a day. Here again diversity is the keynote, for five wheeled models from 11 hp to 60 hp, and a 60 hp crawler, are made. While some of the parts are therefore needed only in limited quantities, economical short runs are made possible by use of universal fixtures with air clamping on most of the machines.

Floor-type conveyors are used at the Kalk works for assembly of Deutz aircooled tractor assemblies. Parts for several types are located at the assembly stations, so that the various machines proceed smoothly despite their differences in construction. Sub-assembly lines supply some of the larger parts while smaller components are stocked on benches adjacent to the main conveyor line.

Vertical boring and turning mills at Cologne can be quickly adapted to machine any of the 90 types of flywheels supplied. Hydraulic copying is used, with the master profile easily changed.

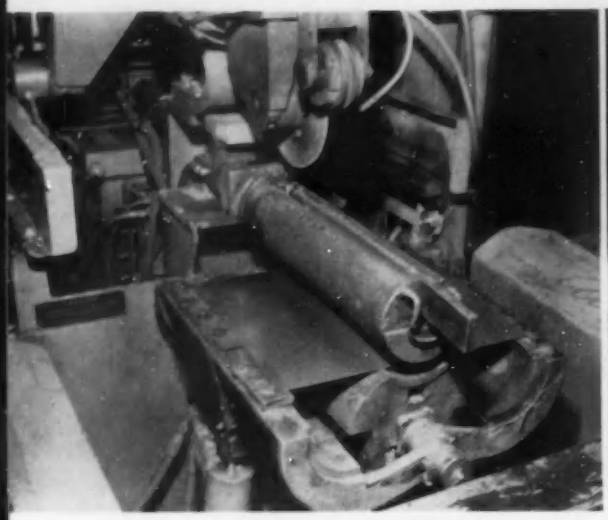


Fig. 1—Close up of the United machine that produces the longitudinal weld on shells, showing the terne plate blank as loaded. It is formed around the mandrel when the split sleeve segments are rocked upward.

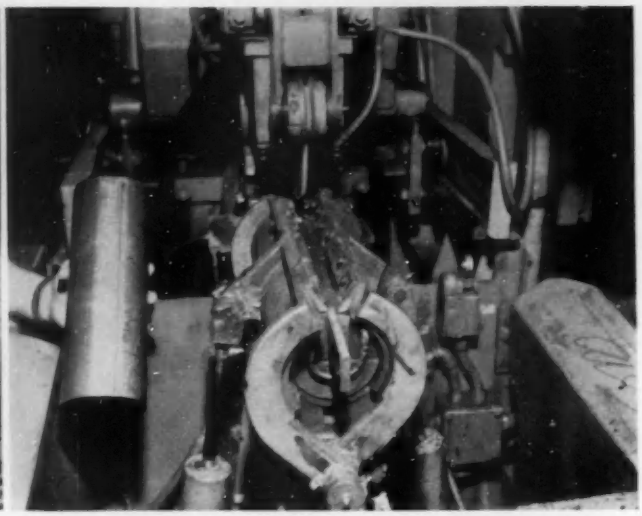


Fig. 2—Same machine shown in Fig. 1 but with the blank formed around the mandrel and ready for seam welding as the wheel at the rear is advanced. A welded shell appears at the extreme left of the illustration.

Fast Setups Produce Small Tanks for Vacuum Brakes

By A. B. Mooers
Manufacturing Engineer
Sheet Metal Plant, Buick Motor Division of GMC

As there is a rapidly increasing demand for Buick cars equipped with vacuum type power brakes, new facilities for making certain extra components required have been provided. One of these is a setup for manufacturing small cylindrical vacuum tanks used in the power braking system. These tanks are of terne plate and are fabricated in the Sheet Metal plant of the Buick Motor Division, Flint, Mich.

Major operations in producing the tanks are to blank, form and seam weld longitudinally the cylindrical shell, to draw the two ends and then to assemble and test the units. Some specialized equipment is employed, one major machine being the United seam welder shown in Figs. 1 and 2. This includes a mandrel around which rocking segments form a rectangular blank that appears in loading position in Fig. 1. Included in the mandrel is a copper alloy strip against which a seam weld is made where the edges of the blank overlap, as in Fig. 2, after forming.

After the blank is loaded by hand, the operator pushes a button that causes the machine to run through its automatic cycle. This starts with elevation of the rocking split sleeve segments. These wrap the blank into welding position. Thereupon, the seam welding wheel is advanced and produces the longitudinal weld at the overlap, over the full length of the blank. As soon as the weld is completed, the wheel is elevated and retracted and the machine opens so that the shell can be unloaded.

Ends for the tank are shallow cups drawn in a press. One of each pair has a hole pierced at its center to receive a small steel tube that has to be soldered in place. To do this soldering, a special machine built by the Metalizing Co. of America and shown in Fig. 3 is used. First, however, the tube, cut to length, is forced into the hole by an air-operated press handled by the man who loads the soldering machine. He sets one cup, with the central tube in place, in each space on the machine conveyor that runs continuously at constant speed.

When each cup approaches the center of the machine, the tube comes in contact with a hollow handled brush that applies a liquid flux fed at a constant rate from a glass tank supported as shown. A short

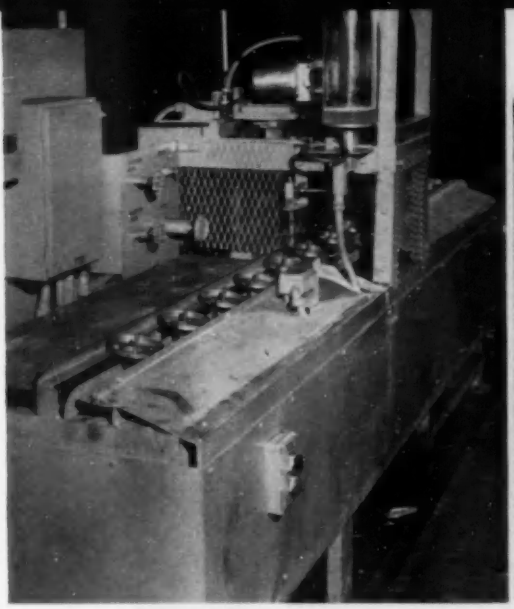


Fig. 3—Special automatic conveyorized machine that solders tubes to drawn ends as the assemblies are advanced under a fluxing brush and a soldering head, the latter supported on a reciprocating carriage above the conveyor.

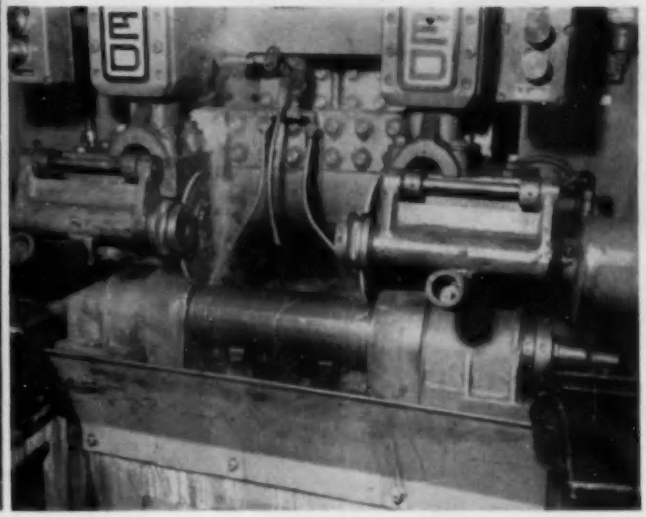


Fig. 4—In this machine, drawn cups are first pressed into ends of the cylindrical shell in an upper position. Then, the shell is placed in the lower position where two circumferential seam welds are made simultaneously, one at each end.

further advance brings the assembly to the point where two drops of liquid solder are applied. Solder is fed in the form of a wire by a special head mounted on a carriage that is arranged to reciprocate on a short track above and parallel to the conveyor.

This head not only feeds the solid solder wire intermittently but includes a small gas burner whose jets melt two drops of solder per workpiece. The burner also heats each joint just long enough to cause the solder to flow into the joint. As this heating requires a few seconds, the burner must travel with the constantly moving cap and tube assembly until heating is completed.

This is the reason for the reciprocating of the head and its burner. This is so arranged and timed that the burner is advanced at conveyor speed with the burning gas jets playing on the joint until the latter is hot enough to cause the solder to run into the joint. At this instant, forward motion of the head ceases and it is quickly moved back to pick up the next assembly on the conveyor and repeat the cycle.

Cooling jets then play on the joint, causing the solder to freeze. By the time that each assembly reaches the end of the conveyor, each workpiece is cool enough for removal and is transferred to the machine, Fig. 4, in which each assembly containing a tube and a mating blank head are welded, one to each end of the cylindrical shell. As the soldering rate is 300 pieces an hour, or about twice that for the welding machines, the soldering unit runs about half as long as the welders, the excess output being placed temporarily in a bank.

Before tanks are welded circumferentially, each shell is set into the upper position of the welder, Fig. 4, with a pair of head cups inserted by hand. In this position, the heads are pressed home so that the lip

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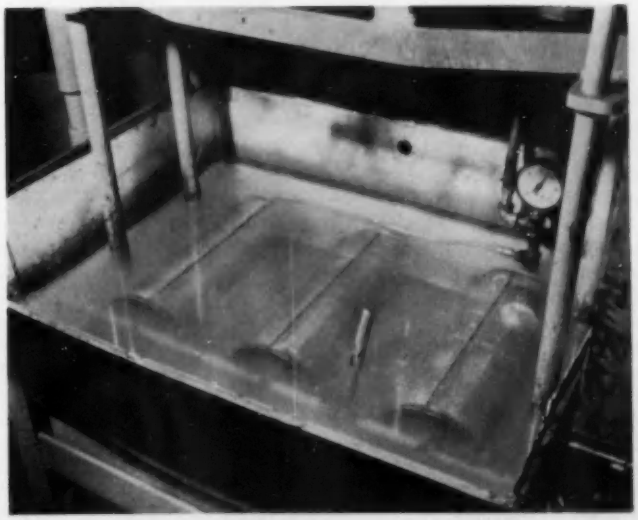
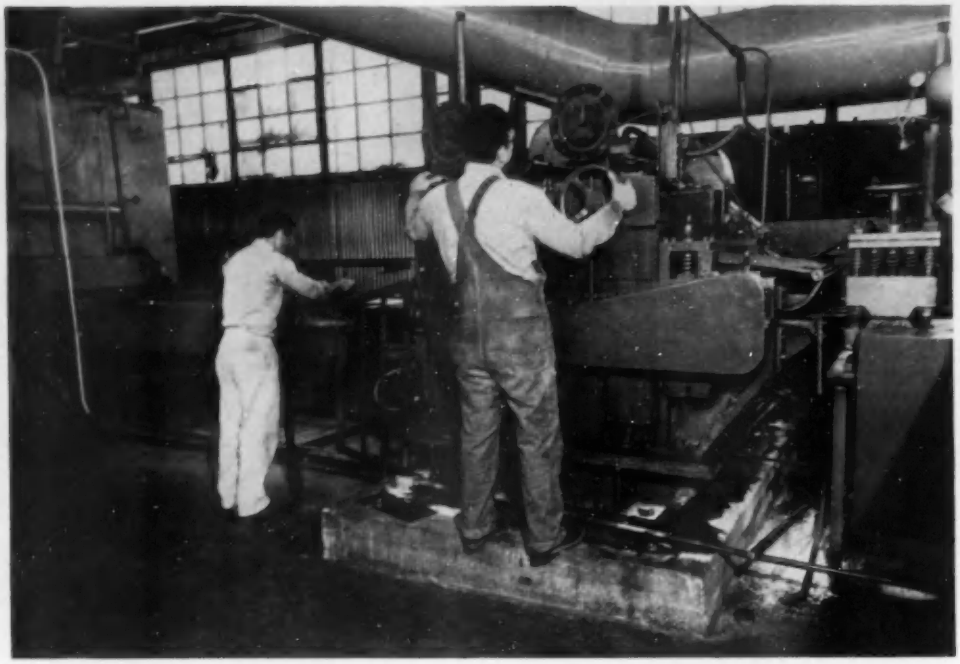


Fig. 5—After welding and soldering are completed, three tanks are loaded into the fixture here shown and they are lowered into water, with air pressure inside each tank to check against leaks. Operation is automatic save for loading and unloading.



In this roller leveling machine the stresses that are held in the panel are relieved by feeding the panel between sets of rollers which bend the panel first upward, then downward in a wave action. The last set of rollers straightens the panel before discharge onto conveyor at rear of the machine.

By
Frank G. Fisher
Vice President and
General Manager
RHEEM AUTOMOTIVE CO.

QUALITY CONTROL *as applied in*

QUALITY control of bumper manufacturing is maintained through a rigid program of uniformity at Rheem Automotive Co., Los Angeles, formerly the U. S. Spring & Bumper Co., and since 1954 the automotive division of the Rheem Manufacturing Co. This program is designed to do two things: meet purchasers' product specifications and reduce manufacturing costs.

Quality control for Rheem Automotive starts in the vendor's rolling mill, where a metallurgical inspector is on hand to spot check the panels for Rheem bumpers as they are readied for shipment. He checks all of the physical properties — surface condition, gage thickness, length and width of the panels — and takes samples of the metal to the supplier's laboratory where a chemical analysis is run to be sure that it meets specifications. Finally, the inspector checks the certification tag number and releases the metal for shipment.

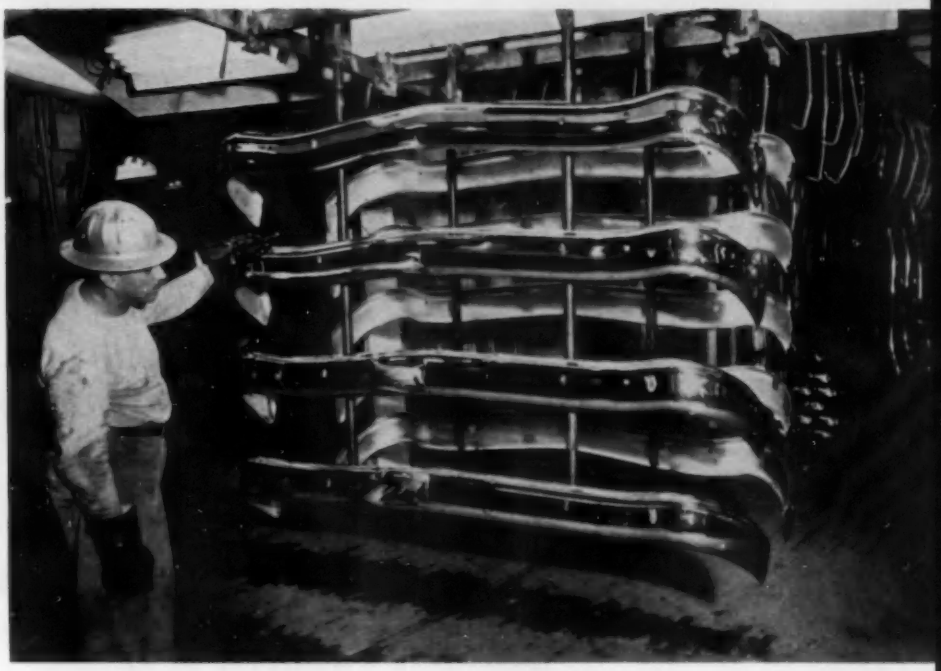
When the metal is delivered to the Rheem Automotive plant, the quality control department analyzes, inspects and controls the manufacture of Rheem bumpers at key operational points.

As soon as the metal arrives it undergoes spot inspection and a thorough checking of all physical properties. Samples are sent to the chemical laboratory for a complete analysis.

Following this basic inspection the metal is sent to pickling where surface particles are eliminated so there will be no embossments while the panels are sent through a roller leveler to relieve stresses in the metal. The leveler operation keeps the bumpers free of stresses after forming.

After the panels have gone through a rough flat finishing machine they are spot checked for thickness. In spot checking, the panels are weighed as they leave the roller leveler and again after they have been rough finished. The amount of metal removed is measured in ounces per square foot. Thickness of the panels is closely controlled by checking the total weight against original specifications. If too much metal has been removed, pressure on the grinding belts is released. Conversely, to remove more metal, pressure on the grinding belts is increased and the horsepower input to the driving units is boosted.

From rough polishing the panels continue by conveyor to the finish polish, washing, rinsing and drying operations. Panels proceed down the conveyor to a



PICTURE AT RIGHT ▶
These bumpers have just passed through the chrome buff and are being conveyed to shipping platform. The inspector is making a visual check to note any possible irregularities. Any bumper not up to standard is removed from the conveyor and corrected.

PICTURE BELOW ▼
Brighteners that are mixed in the nickel tanks are checked for concentration in a Spectrophotometer. The sample is compared with a standard solution which is registered as zero. The variance of wavelength between the sample and the standard solution is checked on a graph, which gives the concentration of the brightener directly.

WEST COAST BUMPER PLANT

surface inspection point where visual and Profilometer tests are made. Each panel is inspected visually; Profilometer spot inspections are made every half hour. Panels are held to a 5 to 10 microinch finish in this final fine finish operation. Should the finish vary beyond these limits, pressure on the finishing belts is increased or decreased accordingly. This is an important step in control because improper finishing would necessitate additional buffing at later stages of the manufacturing process.

The last step in metal preparation is the phosphate and lubricant coating. The chemical solutions are checked constantly for concentration and temperature. Actually, the panels go through several stages of cleaning, phosphating and lubricant coating in order to avoid metal-to-metal contact during the press operation.

Production inspection, which starts after the last forming operation, consists of visual inspection for surface defects that might be caused by the die operation. An inspection station at the end of the conveyorized line is required for the metal polishing line. At this point each bumper is given a careful visual check. Areas that have not been completely polished are identified and corrected.

Quality control for the plating process is strictly a laboratory procedure. Thickness of nickel and chrome is controlled entirely by concentration of the chemicals in the plating vats and by the speed of the conveyor carrying the bumpers. Actually, the first step in plating is the cleaning of the bumpers in caustic cleaning tanks. The concentration of these tanks is checked at the beginning of each day. The samples are titrated in typical laboratory fashion. Next comes the copper plating of the bumper, which acts as a base for the nickel plating. The concentration of copper cyanide is checked by titration at the start of each day's oper-

Visual inspection is given each panel as it travels down the conveyor from the fine finish polish and cleaning. Spots not up to perfection are repolished. Panels with defects that can not be corrected are removed and stacked for salvage committee to determine cause and responsibility.

ation and is varied by adding copper cyanide or sodium cyanide directly into the filters which are tied into the solution circuit.

Checking of pH in the nickel tanks is done with a potentiometer several times in each 24-hour period. Corrections are made by adding chemicals to the solution or by adding fluid to the tanks. A Magne gage is used several times daily to determine the thickness of nickel plating on the bumpers. This magnetic unit measures the distance between the copper plating on the bumper and the head of the gage, which rests directly on the surface of the nickel. Control of thickness is achieved by changing the time element or by increasing or decreasing the amperage in the tanks.

Brighteners in the nickel tanks are checked several times a day by taking samples of the nickel solution and placing them in a Beckman spectrophotometer. The sample is compared with a standard solution of the brighteners; results are obtained as a variation above or below the standard, rated at zero. Correct amounts of the brighteners are added directly through the filters to bring concentration up to the standard.

Chrome tanks are checked twice daily for chromic acid and sulfate content by titrating samples. All the solution in the tanks is held under rigid control to assure a constant thickness of plating with a bright surface. Bumpers are removed from the line periodically and sent to the physical testing laboratory where a cross-section of each is measured to determine the thickness of copper, nickel and chrome.

Another control point in Rheem bumper production follows the chrome plating. Each bumper is visually inspected and gone over for possible surface defects or color deviation.

The salt spray test is the final check in production. This consists of placing the bumper in a special cabinet where a five per cent solution of sodium chloride at a temperature of 95 F is sprayed on the bumper for 96 hours. A daily check is made for pitting or other signs of corrosion, thus insuring a durable coat for the product. This operation is continuous, with a new bumper replacing the tested one at the end of each 96-hour period.

$85 Million Stamping Plant to Be Built by Chrysler

One of the world's largest stamping plants will be built by Chrysler Corp. on a 300-acre site midway between Cleveland and Akron, O. Estimated to cost about $85 million, the plant, to be located one mile south of Macedonia, O., will have 1½ million sq ft of floor space. The manufacturing building itself will take up approximately 34 acres of land.

Chrysler originally planned to build the plant in Brooklyn, O., and acquired 200 acres of property there, but because of "certain complications" decided against it. The company did not indicate what it plans to do with the additional property.

The new factory, on which construction is expected to start by the end of November, will have 28 lines of stamping presses consisting of about 260 machines. It will bring to

Berliet eight-wheel tractor which is powered by a 1360 cu-in. V-12 engine

EIGHT-WHEEL DRIVE TRUCK

Can Haul 100-Ton Load

An eight-wheel drive truck, capable of hauling a 100-ton load, has been produced by the Berliet Co., of Lyons, France, and is in use in the French army.

This vehicle is powered by a 1360 cu in. V-12 gasoline engine of 5.1 by 5.5 in. bore and stroke. Compression ratio is 5.75 to 1 and it develops 450 hp at 2200 rpm. General design is conventional, with a seven-bearing crankshaft, removable dry liners, and valves in head, but many of the auxiliaries are special. Lubrication is dry sump type, with a high and a low pressure circuit, two recuperating circuits, special filtering and cooling for the oil. There are four Zenith carburetors, fed by a fuel pump, with filters for both gasoline and air. Two single-cylinder air compressors are driven off the engine. The magneto is a completely protected aviation type with manual advance. In addition it is equipped with a vibrator coil for starting.

Mounted forward in a pressed steel chassis with welded box-section cross members and gussets, the engine is followed by a hydraulic coupling, a two-plate clutch and a dual gearbox, providing 10 forward speeds and two reverse ratios. A first differential is mounted in the gearbox, from which there are two drive shafts, one going forward to the two front axles, which are drivers and steerers, and the other rearwards to the pair of rear axles, equipped with dual pneumatic tires. The first differential comprises a limited locking mechanism. Number 2 axle comprises a double reduction gear, and transmits the drive to No. 1 axle through a differential. A feature which is common to some other Berliet models is the use of two propeller shafts, one for each wheel, between axles Nos. 2 and 1. The two wheels on one side (right or left) always revolve at the same speed. If the two wheels on one side lose traction a differential lock can be brought into engagement. Except that they are not steerers, axles 3 and 4 are duplicates of 2 and 1. Differential locks are all compressed-air controlled, with limited and progressive action. Suspension is by inverted semi-elliptics for each group of axles, and there is a torsion bar stabilizer on axles 2 and 3.

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seven the number of stamping plants to be operated by the Automotive Body Div., which provides body stampings and assemblies for Chrysler Corp. plants in Michigan, Indiana, and California. The new plant will require about 3500 employes and have an annual payroll of $18 million.

More than half of the outlay will go for new machinery, including the latest materials handling devices. About 45,000 tons of steel per month will be used for production of front and rear quarter panels, doors, deck lids, floor pans, roof panels, hoods, fenders and other body parts.

The $85 million outlay brings to more than $200 million earmarked by the corporation for expansion since the beginning of the year. It also brings to more than $700 million the cost of the company's post-war expansion program.

PRE-PLANNING
Provides for Efficient Airplane Manufacture

By Norman Heath
Assistant Superintendent, A4D Manufacturing
El Segundo Division, Douglas Aircraft Co., Inc.

THE original engineering design concept of the A4D Douglas Skyhawk has been repeatedly expressed—keep it simple. This "keep it simple" concept does not stop with design. It extends into every phase of A4D manufacture.

The Douglas El Segundo project method of developing a new airplane may be different from that used by other aircraft companies. In the A4D project group were representatives of engineering, tooling, production control, scheduling, material and manufacturing. As quickly as overall design was firmed the project group attacked the problems of manufacture.

Each representative of the group brought to the project his own special skills and the representative of manufacturing was permitted the prerogative of suggesting revisions that would simplify the manufacturing job.

As a result, in manufacturing the A4D more than any other El Segundo airplane, the main components are completed, tested and checked out on the individual component assembly lines. This stops congestion on the final operational line before it begins, because by the time major assemblies reach mating areas many functional tests are completed.

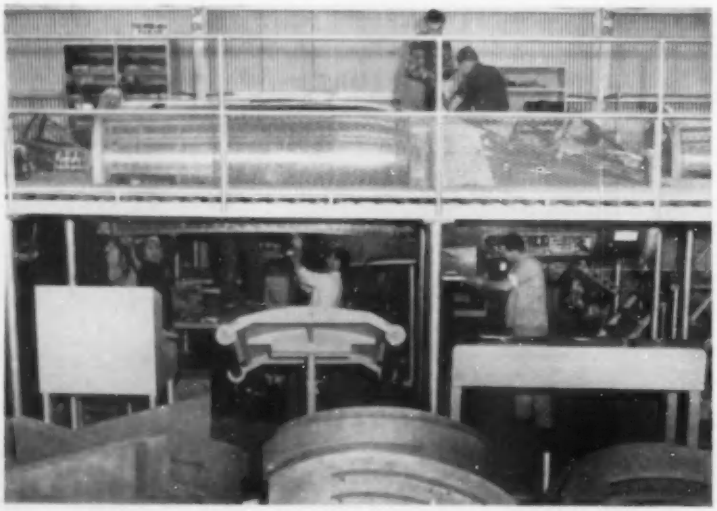
The A4D has four major components—the forward fuselage section, the wings, the aft section and the engine. As the engine is a G.F.A.E. item there are but three major manufactured structures and each of these was searchingly examined.

To completely visualize operations, detailed assembly lines were constructed and improved long before actual work in the shop started in manufacturing. Production flow was arranged so that the wing section could grow and become a completely sealed product before it reached the two-level wing assembly line. This two-level line was not only engineered for the product but for ease of operation and efficiency for the people who would work on the assembly.

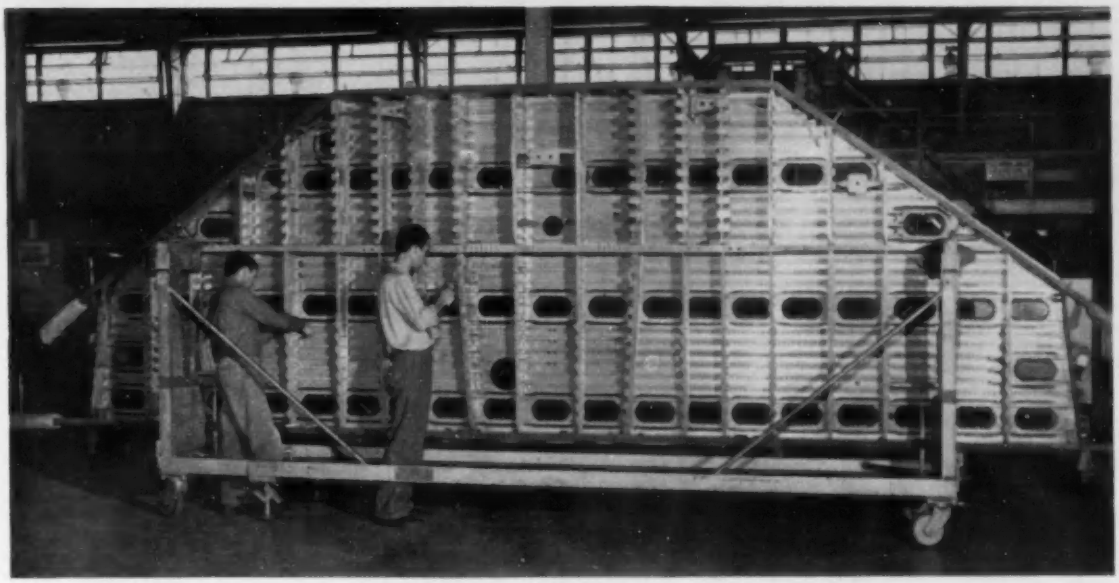
Using well established measurements of human engineering, the average height of U. S. workers (5 ft, 9 in.) in industry was used to locate the lines for underside work. The man on the floor can reach all parts of the underside of the wing without stooping and without stretching. Using the same principles, the platform on which the workers would stand for top-side work was designed. The result is a two level assembly line that keeps the wing structure in optimum position for work on all phases of its assembly.

The fuselage line (the forward section) follows the same principles. Top-side work is done on the upper level and all work of installation, testing and checkout is done at convenient work height from the floor level. Parts required, as well as all accessories that should enter the assemblies, are stocked or flow to the proper positions of both these lines.

Standardization is more than just a term in such a project. Wherever parts of a like nature could be consolidated into a single type, this was done and



The fuselage line for the A4D is also two levels. Parts flow in foreground to proper areas for assembly.



The wing tank section of the A4D. All rivets used on this structure are one type and size.

The wing assembly line is on two levels and work is done on each level.

resulted in considerable savings, not only of stock but of storage space. Moreover, assemblers had less parts to remember.

The rivets on the wing assembly, for instance, are all the same type and size. They differ only in length. Airplanes of the past may have had as many as a dozen or more different types and sizes in like areas.

Other economies were made. The tooling was designed so that hand tools, handling equipment, work stands and test equipment could be interchangeable.

While the rough bulkhead structures of the wing are of different sizes because of varying conformations, the components that make up the jig structures are standardized. Detailed parts are not all drilled for attachments prior to assembly. Many parts are assembled blank and drilled through all laminates with the aid of drill jig templates. This method eliminates many time consuming fitting operations.

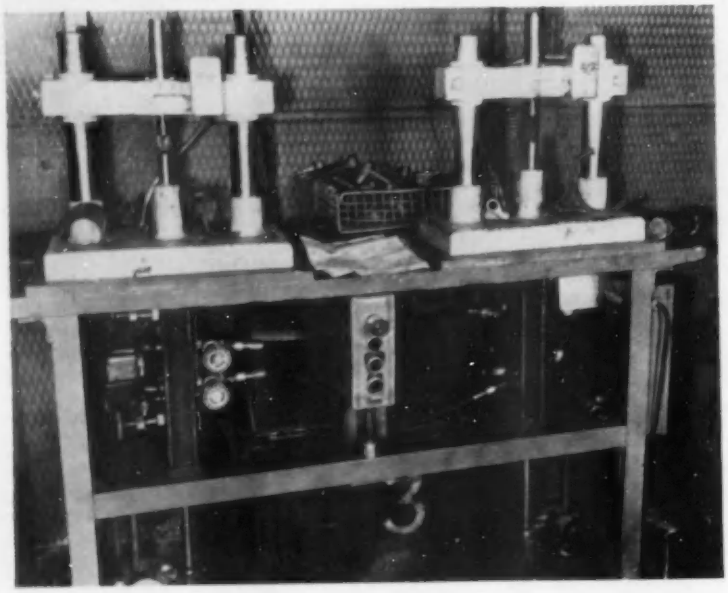
Like economies of materials and motion abound on the A4D line and the project pre-planning has paid off. The line is in full production adding another outstanding weapon to the Navy's air arm.

Italian Vehicle Production, Exports Show Half-Year Gain

Italian automobile production was boosted 16.7 per cent and exports jumped 86.3 per cent during the first six months of this year, compared with the corresponding period of 1954. Total output was 121,646 passenger cars, light trucks, heavy trucks, and buses. Exports increased throughout the entire range in totaling 36,728.

Fast, Accurate Hole Sizing

FIG. 1—These two light home made hydraulic presses are used with marked economies to size and to provide an excellent finish on the shaft holes in hardened forged steel shifter forks.



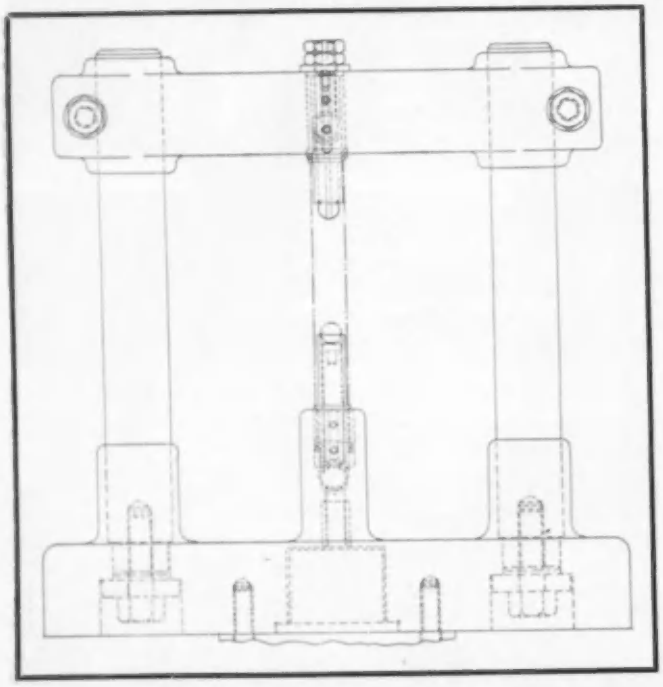


FIG. 2—Sectional view of the light hydraulic press setup showing the ram, ball, ball parts and other components. Tubing for the ball return has been altered slightly as Figs. 3 and 4 indicate.

AMONG some rather unusual jobs done in the Jackson, Mich. plant of the Clark Equipment Co. is that of giving holes in certain parts their final size and finish by pressing a carbide ball through the holes. Formerly, this sizing was done by honing but, by using only a very simple homemade press, the ball does the same job just as well and about five times as fast.

On one type of job, only two carbide balls have been required over a two-year period during which approximately one million shaft holes in transmission shifter fork forgings have been sized. Similar final sizing of holes in other parts is also done, one such being a steel-backed bronze bushing.

Before the fork forgings reach the press used for hole sizing, the hole for the shaft is drilled and broached. A small side hole is then drilled and tapped and a second broach is passed through the shaft hole to remove the burr thrown into the hole by the side operations. Forgings next go through heat-treating to produce 61 Rc hardness. After heat-treating, the shaft hole diameter is 0.740-0.742 in.

Until ball sizing of the shaft hole was adopted, the hole in the hardened part was brought to final size by honing. Now, honing is done on only a small percentage of fork forgings in which metal around the hole is not of uniform thickness. "Ballizing," as it is called, slightly expands the metal and, if its thickness is not uniform, the hole will not be truly cylindrical. When, as in nearly all forgings, the wall is of substantially uniform thickness, true holes of excellent surface finish are produced by the carbide ball and their size is brought within the 0.742-0.744-in. limits specified.

Equipment employed in final sizing of fork holes is shown in Figs. 1 to 4 inclusive and consists of two light homemade presses, only one of which is required for a given sizing job, although

with Carbide Ball Setup

By Fred Foote
Process Engineer
Transmission Division
Clark Equipment Co., Jackson, Mich.

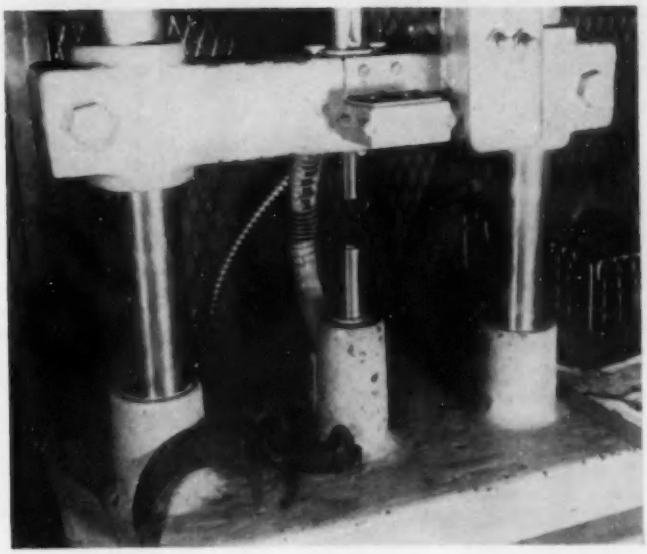


FIG. 3—Closeup of one press used to force the carbide ball shown on top of a press ram through the shaft hole in a hardened steel shifter fork forging, one type of which appears in the foreground.

both may be employed when production rates must exceed that met by a single press. A hydraulic cylinder is used on each press and the press is itself a very simple assembly having two tie bars connected by a cross beam at the top, Fig. 2.

Each press is so arranged that the ram is forced upward when a button controlling a solenoid valve is pressed. As the up stroke is completed, the ball compresses a light spring that trips a micro switch to operate a solenoid valve, whereupon the ram is automatically lowered for the next working stroke. A small pump is arranged to supply hydraulic fluid to cylinders of both presses.

In each setup, the ball rests, at the start of the cycle, on the top end of the ram (which is slightly smaller than the hole) and inside a cylindrical guide at the center of the press bed, but at a lower level than shown in Fig. 3. Before pressing the start button, the fork forging is placed with its shaft hole roughly in line with the ram on top of the tubular ram guide, as in Fig. 4. When the start button is pressed, the ram moves upward, forcing the ball into the hole centering the latter precisely and pressing the fork against a tubular stop.

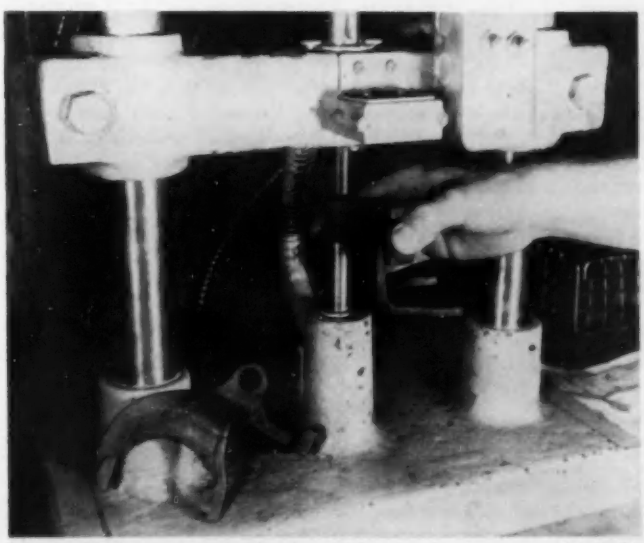


FIG. 4—Placing a fork forging in position for forcing a carbide ball through the shaft hole after which operation the ball is returned (via the tube made partly from a wire helix) to the top of the ram that has pushed the ball through the hole.

As the ram continues upward, the ball is pushed through the hole and into the upper tube until it reaches a rear port, whereupon the ram stops and the ball, which has compressed a light side spring, is ejected by it through the port and rolls into a curved return channel, made from tubes and coiled wire. This conveys the ball back into the lower ram guide. While the ball returns, the ram makes its return stroke at the end of which the ball again comes to rest on top of the ram, ready for the next cycle.

Return of the ram frees the fork forging. Operation is almost as fast as the operator can place and remove the fork forgings, as the working and return strokes take place in a very short time.

Carbide balls possess extreme hardness, of course, and outlast at least twenty hardened steel balls. There is no galling of the ball itself or of the hole and any increase in temperature en-

(Turn to page 124, please)

. . of the METAL SHOW FOR '55

INTERNATIONAL in scope, the 37th National Metal Congress and Exposition—the Metal Show—will be presented from October 17 to 21 at Philadelphia's Conventional Halls and hotels. Over 400 firms will display the latest advances in the technology of metalworking, and many of these exhibits are described in the following pages.

The Congress is again sponsored by the American Society for Metals; American Welding Society; Institute of Metals Div., American Institute of Mining and Metallurgical Engineers; and Society for Non-Destructive Testing. Headquarters for each will be: ASM—Benjamin Franklin Hotel; AWS—Bellevue-Stratford Hotel; AIME—Adelphia Hotel; SNDT—Sylvania Hotel. Technical programs of each society will be conducted in the respective hotel.

On Saturday and Sunday, October 15 and 16, the ASM will hold its annual Seminar, both morning and afternoon sessions. Subject: "Theory of Alloy Phases."

Beginning Monday, October 17, the ASM and the AWS will hold morning, afternoon, and evening technical sessions. The Institute of Metals Division, AIME, will hold daily and evening technical sessions beginning Monday and continuing through Wednesday. The Society for Non-Destructive Testing will hold morning and afternoon sessions, Monday through Friday.

The ASM will hold its annual Metallographic Exhibit during the entire week. The annual meeting of the ASM will be held Wednesday morning, October 19, in the Grand Ball Room of the Benjamin Franklin Hotel, and the annual banquet will take place on Thursday evening, October 20.

Robert H. Aborn, director of Research Laboratories, United States Steel, Kearny, N. J., will give the Edward deMille Campbell Memorial Lecture immediately following the ASM annual meeting.

William Justin Kroll, a native of Luxembourg, and a U. S. citizen since 1950, is the winner of the Albert Sauveur Achievement Award, presented for his pioneering work on malleable titanium. Dr. Kroll's first successful method for making satisfactory titanium in commercial quantities is the result of his initial research, begun in 1937. The value of his work, recognized by the U. S. Bureau of Mines, has been widely accepted by industrial companies.

Alfred L. Boegehold, head of the Metallurgy Dept., Research Laboratories Div., General Motors Corp., is the recipient of the Gold Medal. The ASM Gold Medal was established in 1943 to recognize outstanding metallurgical knowledge and special ability in the diagnosis and solution of diversified metallurgical problems.

The Henry Marion Howe Medal Award will be made to A. E. Nehrenberg, Supervisor, Research Laboratory, and Peter Lillys, Research Metallurgist, both of the Crucible Steel Co. of America. The medalists were selected on the basis of their joint paper covering "High Temperature Transformations in Ferritic Stainless Steels containing 17 to 25 per cent Chromium."

Ductile chromium metals, of immediate importance to national defense planning, will be discussed in conferences sponsored jointly by the Army Office of Ordnance Research and the American Society for Metals. One of the sessions will cover "World Wide Research on Ductile Chromium." Another session in this series will cover the "Physical Metallurgy of High-Chromium Alloys."

The third session will discuss chromium metal preparation and application and mechanical properties of the metal. There will also be presented papers on "Volume Change and Evolution of Gases on Heating Electrolytic Chromium," "Preparation and Properties of Iodide Chromium," "Electrowinning of Chromium from Trivalent Solutions," "Effects of Impurities on the Ductility of Chromium."

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What's **NEW** at the

NATIONAL METAL SHOW

OCTOBER 17-21

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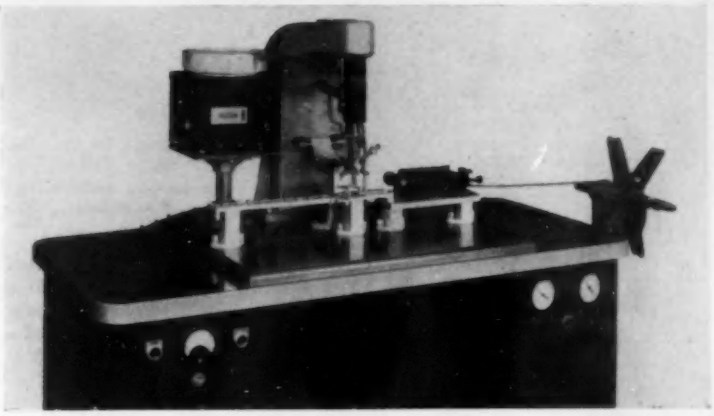
Automatic Stud Welder

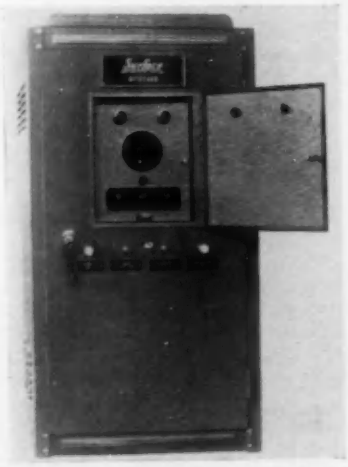


In operation will be a fully automatic stud welding machine, model X-8000. Utilizing a special process of stored energy stud welding, this unit is fixtured for welding studs to strip stock fed continuously from a coil. Studs can be welded at the rate of about 80 per minute; while power consumption averages 1½ kva. (Graham Manufacturing Corp. Booth 2031)

Circle 30 on postcard for more data

Carbon Control Instrument

IN operation will be an automatic carbon potential control instrument for controlled atmosphere heat treating. This new "Autocarb" controller provides a means of controlling the dewpoint and, hence, the carbon potential of a heat treat furnace atmosphere. It is applicable to processes such as gas carburizing, clean hardening, etc., where a permanent record is not required.



Autocarb controller with signal lights for high and low dewpoint indication

In addition, metal heating and heat treating equipment for processes from the ingot to the finished product, will be presented in an animated display. *Surface Combustion Corp. Booth 304.*

Circle 31 on postcard for more data

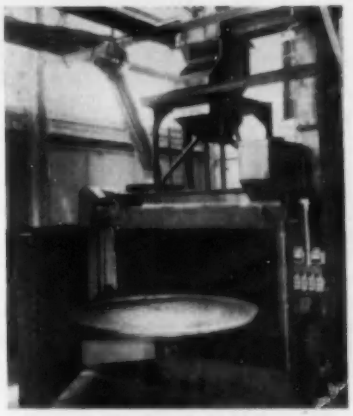
Blast Cleaner

AN airless abrasive blast cleaning machine, the 96 in. swing table, will be displayed for the first time. It is applicable to cleaning or descaling automotive castings, forgings, heat treated parts, weldments, or stampings; deburring metallic automotive components; preparing metallic parts for rubberizing, painting, plasticizing, and enameling; and peening metallic parts to increase fatigue resistance.

The work table will hold either a few large pieces, or many small parts, at one time. The table can project into the room for ease in loading or unloading heavy parts with jib crane or lift truck. Blasting operation is automatic.

Also exhibited will be a Tumblast airless blast cleaner, a Liquamatte wet blasting machine, and a Dustube dust and fume collector. *Wheelabrator Corp. Booth 1402.*

Circle 32 on postcard for more data



An airless abrasive blast cleaning machine by Wheelabrator

Aluminum Castings

CASTINGS produced by the Antioch process will be on display, among which will be cast aluminum torque converter elements produced for a heavy-duty transmission. Also shown will be aluminum castings in the form of tire molds, supercharger impellers, wave guides and centrifugal compressor impellers.

The company will in addition demonstrate its latest work on ductile iron tire molds. *Morris Bean & Co. Booth 452.*

Circle 33 on postcard for more data

What's NEW at the

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Back-Up Driven Rolling Mill

The Stanat model TA-625, 2¼ in. and 8 in. by 10 in. backup driven four-high rolling mill facilitates the rolling of strip to extra-close tolerances, at speeds up to 500 fpm.

To be shown is a backup-driven four-high rolling mill, designed to handle both ferrous and non-ferrous strip at speeds up to 500 fpm. It will roll down to less than 0.001 in. finishing gage, holding a total thickness tolerance of five per cent. The unit has 8 in. diam by 10 in. face width backup rolls, and uses work rolls within a 2½ in. to ¾ in. diam range. Featured is the backup drive, which is said to facilitate (a) rapid work roll changing, (b) use of different diameter rolls to suit desired finishing thickness, (c) lower cost and ruggedness of tungsten carbide rolls due to simple shape, (d) heavy pass reductions without lateral "bowing out" of work rolls, (e) heavy rolling torque capacity, and (f) easy convertibility to two-high mill setup for breakdown and skin-pass rolling.

Also displayed will be a rotary gang slitter. One recent installation comprised a slitting machine with a unit-mounted core plate recoiler and scrap winder, and an expanding drum pay-off. This slitter is producing 18,000 lb of coiled strips every eight hours, including loading, setup of arbor knives, banding of finished coils, and unloading, with one operator. An unusual core plate recoiler is said to eliminate push-off equipment and facilitate the handling of finished coils. Tolerances as close as plus or minus 0.001 in. are possible. *Stanat Manufacturing Co., Inc. Booth 1355.*

Circle 34 on postcard for more data

X-Ray Scanning Spectrometer

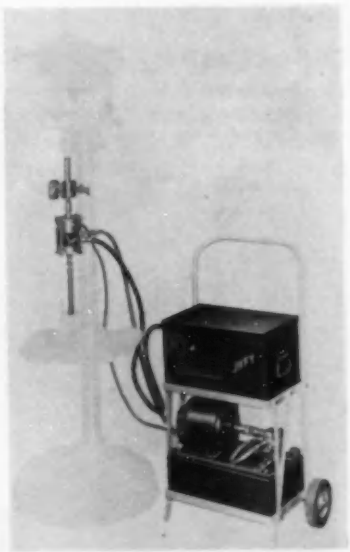
FIRST public showing will be made of an X-ray scanning spectrometer featuring non-destructive analysis by X-ray fluorescence. Various forms of material may be analyzed—liquids, powders, and solids—with accuracy rivaling the best chemical methods and speed comparable to direct-reading procedures, according to the maker. All except the lighter elements in the periodic table are said to be accurately and easily determined. Dependent upon the matrix and the particular element being considered, the limits of detectability lie between one part per million and 100 parts per million.

Also introduced is a single triple-purpose instrument, known as the Quantograph, providing a variety of spectrochemical techniques. As a direct-reading instrument coupled with a source and recording console, the unit can be applied either as a monochromator, allowing sequential analysis of any group of elements in a matrix; or as a spectrometer, allowing high-speed parallel analysis of a selected group of elements. In this latter capacity, the instrument becomes an optical emission Quantometer. *Applied Research Laboratories. Booth 1219.*

The ARL X-Ray scanning spectrometer for non-destructive analysis

Circle 35 on postcard for more data

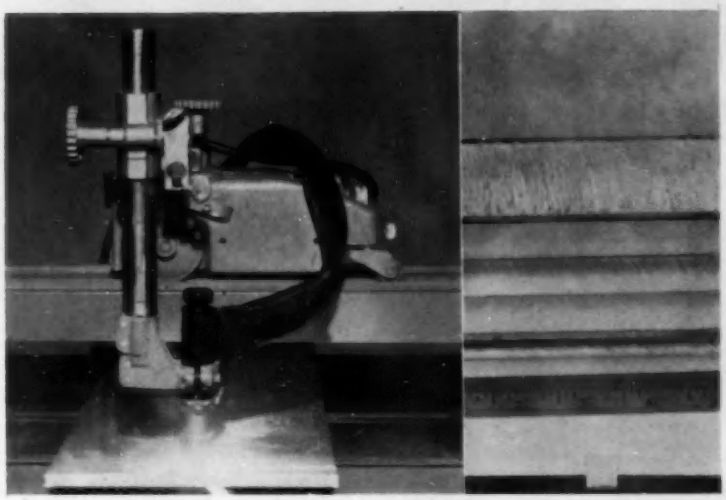
Metal Disintegrator



Quick removal of broken taps and drills, without the use of electronic tubes, rectifiers or condensers, is featured by the exhibitor of this machine. (Jiffy Tool Supply Co., Inc. Booth 2140)

Circle 36 on postcard for more data

Heliarc Cutting for Non-Ferrous Metal Fabrication



Heliarc cutting in the processing of non-ferrous metals such as aluminum, with the new head mounted in an Oxweld CM-45 machine carriage; and sample cuts

FIRST public showing and demonstration of Heliarc cutting, a new process for shaping non-ferrous metals, will be made. This method of using a gas-shielded arc for cutting is said to make the fabrication of non-ferrous metals easy, increase cutting speed, permit the making of sawlike quality cuts, and greatly reduce cutting and edge-preparation costs.

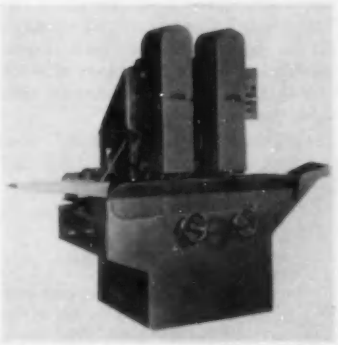
Heliarc cutting employs a very high-temperature, high-velocity, constricted arc between a tungsten electrode and the piece to be cut. The concentrated and columnated energy of the arc stream melts and ejects a thin section of metal to form a kerf. This jet-like action removes the molten metal mechanically, and the gas atmosphere prevents oxidation of the cut face.

The process brings all the features of flame-cutting to the cutting of aluminum. Normal mechanized cutting speeds are 300 in. per minute in ¼-in. material, 125 ipm in ½-in. metal, 75 ipm in ¾-in. plate and 50 ipm in one-inch material. It can be used manually as well as mechanically; in any position; and for cutting straight lines, bevels, circles and shapes. The speed and quality of manual cutting vary depending upon operator skill, with an average speed of about 60 ipm on ½-in. aluminum plate. *Linde Air Products Co. Booth* 1375.

Circle 37 on postcard for more data

Belt Grinder

A MULTIPLE - HEAD, conveyor - type abrasive belt grinder, designed for wet or dry grinding and polishing of ferrous, non-ferrous, plastic and other materials, will be displayed. Designation is model 680. Automotive applications include pre-polishing of trim components prior to plating. It is suitable for grinding and deburring flat surfaces on a high production basis. The machine has a



Engelberg-Huller model 680 belt grinder

maximum piece capacity of four in. high, six in. wide, any practical length. Abrasive belt speed is 5500 sfpm; while speed of the conveyor belt is adjustable from 5 to 30 fpm. The 680 is available with single, double or any number of heads, and with 5 or 7½-hp drives. Magnetic chuck is optional.

Also featured in the display will be the model 648 utility grinder. Principal applications of this six-in. grinder include freehand work such as flat surfacing, squaring, rounding, deburring, chamfering and polishing of metals, wood, glass and plastics. *Engelberg Huller Co. Booth 1073.*

Circle 38 on postcard for more data

Cutting Machine

A TRANSVERSE type cutting machine for the cutting of plate and sheet stock for ferrous and non-ferrous metals will be introduced. This model, the SS-20LR, has a new locking roller assembly which locks it to a special channel type rail. The machine uses latest-type abrasive wheels in the cutting of ferrous metals such as stainless steel and hot rolled plate; and employs a circular steel saw blade in the cutting of non-ferrous metals and non-metallic materials. Featured are its accuracy and speed in cutting. It is said to be able to cut ¼-in. stainless steel plate four feet long in 30 sec, or some eight sec per foot; ¼-in. aluminum plate, 49½ in. long in nine sec.; one-in. Melamine stock at the rate of 100 sq in. per minute; 1½-in. laminated plastic at the rate of 10 sec per foot. The machine is designed to hold tolerances to 0.010 in. *Stone Machinery Co. Booth 551.*

Circle 39 on postcard for more data

Electrostatic Spraying, Induction Heater

IN operation will be a new high potential power supply, in combination with newly developed Ionic guns, for electrostatic spraying of paint. The electronic power supply unit is capable of producing a peak of 140 kv. Designated the model HV-140, it is supplied as a two-piece, remote-controlled unit.

Also introduced will be the model SC-1 one-kw induction heater, specifically manufactured for soft soldering operations, although also usable for various other operations such as tempering, annealing and silver soldering within its capacity. The unit is an air-cooled self-excited radio frequency oscillator which operates at about 400 kc. Designed to operate from a single phase, 115-v, 50 or 60 cycle line, the direct current required is supplied from a self-contained power supply. *Scientific Electric. Booth 1279.*

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Aluminum Billet Heater

The model CSC billet heater for aluminum, features an improved billet stop and thermocouple assembly, new heating coil, and power factor correction capacitors mounted within the heater enclosure. (Magnethermic Corp. Booth 1740)

Circle 41 on postcard for more data

Barrel for Finishing

To be exhibited is a heavy-duty barrel for precision finishing of stamped, forged, machined or cast parts. It is said to be designed to tumble heavy parts and to operate for long runs. Compartments are lined with a ¼-in. thickness of neoprene. Drum ends and wrapper sheet are of ¼-in. steel plate, while the divider between compartments is of ⅜-in. plate.

Heavy-duty barrel for precision finishing, the Lorco 200

Inside dimensions of the octagonal compartments are 19 in. across from flat to flat, by 9½ in. long. Each compartment has a volume of 1.6 cu ft and will hold a total load of about 250 lb. A variable speed drive is provided, adjustable over a range of from 8 to 40 rpm; and barrel may be run either forward or reverse.

Designated the Lorco model 200, this unit is offered by *Lord Chemical Corp. Booth 1059.*

Circle 42 on postcard for more data

Hardness Tester

In a combined display will be shown a fully automatic Rockwell hardness tester, with vibratory feed, which is capable of testing ferrous and non-ferrous metals at the rate of 1000 to 1200 per hour. After testing, the parts are routed into bins labeled "hard," "good," and "soft." Colored lights show the classification of each part as it is tested.

In combination with the above there will be a display of abrasive cutting machines and wheels. Included is a dry abrasive cutting machine, capable of a speed of about three seconds per sq in. of material being cut. Known as the Sever-All, model 28, it is available in both stationary and portable types. It is designed to handle material up to four in. square at 90 deg to axis for solid steel, eight in. by 90 deg to axis for channels. *American Chain & Cable Co., Inc. Booth 1044.*

A fully automatic Rockwell hardness tester, offered by American Chain & Cable Co., Inc.

Circle 43 on postcard for more data

Zinc Phosphate Coating

In the Bonderite 800 series will be presented a development in zinc phosphate coating called ICRA (internal crystal refining agent), which is said to produce a denser coating with finer crystalline structure. It may be used on steel surfaces and on zinc surfaces such as galvanneal, zinc base die castings, and electrogalvanized in mixed production with steel. The method is claimed to provide a very smooth, continuous phosphate surface, making for improved evenness of paint penetration and adhesion.

Samples of Pre-Namel 410, a material permitting the application of a porcelain enamel finish coat directly to ferrous materials, will also be shown. The process by-passes the conventional ground coat and nickel flash steps. Torsion and impact tests indicate improved adhesion and surface characteristics. *Parker Rust Proof Co. Booth 1549.*

Circle 44 on postcard for more data

Automatic, Self-Contained Brazing Machine for Small Parts

For automatic brazing of small and medium-size assemblies, such as carburetor floats and radiator top and bottom tanks, a production machine will be shown in operation. It is a self-contained, gas-fired packaged unit, with controlled combustion and timing for producing joints of uniform quality at high speed. The maker states that simple joints in small parts may be processed by one operator at rates as high as 500 assemblies per hour.

The same exhibit will also demonstrate galvannealing, high-speed heating of large steel sections, automatic heating for forging, and automatic heat treatment, as well as continuous-melt aluminum furnaces. *Selas Corp. of America. Booth 1601.*

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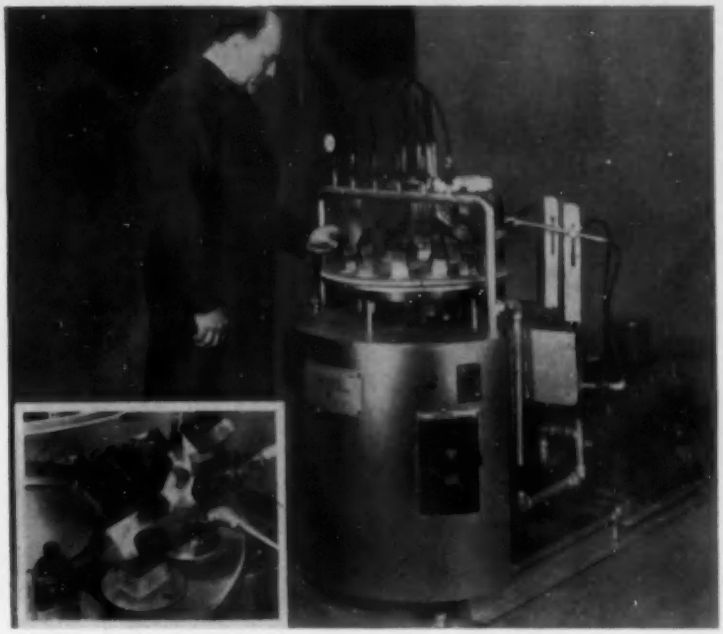

The Selas packaged automatic brazing machine is delivered complete with turntable, combustion controller, and all necessary equipment, mounted on a single frame. Installation requires only standard connection to fuel gas, compressed air and electric lines.

Induction Furnaces

Featured in one booth will be a line of high frequency induction furnaces for melting metals, forging, high temperature and carbide work, vacuum vessels, etc. Converter and generator furnaces and their control panels will be in simulated operation.

Also available will be information concerning recent induction furnaces for making large (1000 lb) vacuum melts, and data covering the simultaneous melting of steel or non-ferrous alloys in several furnaces to produce single castings up to 40,000 lb in size. *Ajax Electrothermic Corp. Booth 1619.*

Circle 46 on postcard for more data

Phosphating Setup

A five-tank cleaning and zinc phosphating line in operation will be featured in one of the exhibits. Steel panels will be alkaline cleaned, rinsed, phosphated with CrysCoat HC, rinsed, and given a final CrysCoat FH rinse to produce a dense, paint-gripping coating.

The company, manufacturers of specialized metal cleaning and treating materials, will also feature recently developed products for removing zinc chromate primers from aluminum, alkaline rust removal, acidic barrel finishing, and pickle control, as well as the new solution-lifting steam gun, model 551, featuring light weight, easier handling, and cooler operation. *Oakite Products, Inc. Booth* 1767.

Circle 47 on postcard for more data

Brush Surfindicator Accessories

Two new accessories for use with the Surfindicator instrument for measuring surface finish roughness will be presented. One of these is the motor drive, model BL-114, intended for mechanical tracing of the instrument's pick-up. This has a reciprocating stroke with a length adjustable from 2⅞ in. to less than 1/16 in. The stroke speed is constant at ⅛ in. per second. Instantaneous reversal and constant speed are said to assure surface roughness measurements with a high degree of accuracy.

The second accessory, a small bore adapter, model BL-113, expands the usefulness of the instrument from general purpose pick-up to very small internal diameters and other limited access areas. *Brush Electronics Co. Booth 1728.*

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Two accessories for the Brush Surfindicator expand the scope of this instrument in measuring surface finish

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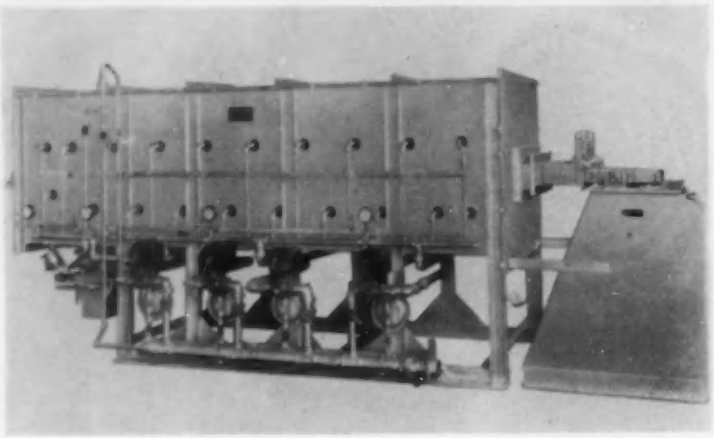

The AGF controlled atmosphere reciprocating furnace is one of the major components making up a continuous heat treating facility which is completely automatic in operation

Continuous Heat Treating

AN operating exhibit will be a completely automatic continuous heat treating installation consisting of a rotary feeder, a controlled atmosphere reciprocating furnace, and a quenching tank. This equipment will discharge work into a washing machine and tempering furnace located in an adjoining exhibit. The facility is available in various sizes having production capacities from 100 lb per hr to 800 lb per hr. *American Gas Furnace Co. Booth 1914.*

Circle 49 on postcard for more data

Cutting Oils

A SOLUBLE oil HD, for cutting, boring and broaching operations, will be introduced. It is a heavy-duty water-emulsive coolant formulated with some of the extreme pressure characteristics of a sulfurized oil, thus utilizing the heat transfer properties of water while functioning under high pressures.

Another cutting oil, Transultex B HD, is transparent and incorporates extreme pressure characteristics for cutting, broaching, threading and similar operations requiring EP properties. Besides providing heavy-duty protection, the new product enables the operator to see both the tool and work surface during an operation.

Also introduced will be the new drawing compound 2, replacing a product which bore the same name, intended for cold-forming operations. It is a mixture of mineral oil, emulsifying agents, non-abrasive pigment, and a dispersion agent which retards the settling out of the pigment. Dies may be stored for long periods, directly following a production run, without compound caking or hardening. The product is water miscible in ratios ranging from equal parts to 1 to 10 parts. Adhesion characteristics are said to have been improved, yet it washes off readily during water cleaning. *The Texas Co. Booth 743.*

Circle 50 on postcard for more data

Surface Treatment

PRODUCTS, processes and service aimed to improve results of surface treatment of metal parts will be demonstrated.

A recently developed water soluble carburizer, Perliton 397, will be shown in use in an immersed electrode salt bath furnace. Production advantages of this new carburizing salt are said to include high surface hardness, rapid carbon penetration, wide flexibility of use, uniform eutectoid case and easy cleaning. Carburized parts will be oil quenched in high speed Houghto-Quench.

A still-tank room temperature cleaner combination — Houghto-Clean 402 and 403, will be demonstrated in another operating display.

Phosphating agents, rust preventives, blackening salts, cutting oils and bases, chemical rust-inhibited grinding compounds, pickling inhibitors, cleaners, packings, hydraulic oils and fire-resistant Houghto-Safe hydraulic fluid will also be exhibited. *E. F. Houghton & Co. Booth 724.*

Circle 51 on postcard for more data

Steel Exhibit

AMONG three major displays, the exhibit of a nationally operated steel organization will include demonstrations of the company's facilities for meeting specialized material requirements.

An eight-torch electric-eye guided oxygraph flame-cutting machine will be in operation, showing plate steel accurately flame-cut to close tolerances and to practically any desired shape. The improved machinability of Ryeut 40 lead treated alloy steel over that of AISI 4140 will also be demonstrated.

Additionally contained in the exhibit will be a line of tubular steels, including seamless and welded, carbon and stainless. *Joseph T. Ryerson & Son, Inc. Booth 931.*

Circle 52 on postcard for more data

Hardening Furnaces

HIGHLIGHTED will be a redesigned line of the model Y high-speed steel hardening furnaces. On display and in operation will be the size No. 2 model Y furnace with a new roller bearing straight line door mechanism, a one-piece fabricated mounting pedestal, and internal refinements which are said to improve heating and operating efficiency. During the exhibit hours, molybdenum high-speed steel tap blanks will be hardened using the diamond block method of atmospheric control. Should any visitor wish to bring samples of high-speed steel tools, the facilities will be available for "on the spot" hardening. *The Sentry Co. Booth 635.*

Circle 53 on postcard for more data

(*Turn to page* 161, *please*)

high production–60 tons' worth

Here's a sixty ton Clearing O.B.I. that's really pulling all its weight at the Hussmann Refrigerator Company in St. Louis. Hussmann required a variety of patterns in ventilator panels for their line of commercial refrigerators. Instead of making each panel separately, they produce a continuous pattern from automatically fed strip stock. Simple die changes make it possible to change the pattern easily and quickly. An open end roll feed and vari-speed drive on the press gets top output out of every working hour.

There's a way that the efficiency of a Clearing O.B.I. can solve a production problem for you. It gives you the kind of smooth operation your operators will go for and the ruggedness that comes through for you in the pinches. We'd be glad to talk to you personally about these things. Why not call us?

Write for your copy of Clearing's O.B.I. catalog. We'll send it promptly at no obligation.

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P&J NEWARK AUTOMATIC

GEAR CUTTING MACHINES

At the Houston, Texas plant of the Link-Belt Company — nationally known manufacturer of power transmission and conveying equipment—a NEWARK No. 7 Automatic Spur Gear Cutter machines this massive sprocket wheel quickly, accurately, economically. Part of the drive unit for a specially designed oil well slush pump, the 41 inch diameter wheel has 85 teeth and will be used with a Link-Belt sextuple width, 1-1/2 inch roller chain. The companion sprocket on the floor (also cut on the same NEWARK Machine) has 32 teeth.

POTTER & JOHNSTON-NEWARK

Assets of the Newark Gear Company have recently been acquired by **POTTER & JOHNSTON**, subsidiary of Pratt & Whitney, Division Niles-Bement-Pond Company. In addition to the complete line of P&J Automatic Turret Lathes, these long-famous automatic gear machines are now being manufactured in our Pawtucket, Rhode Island plant, and are made available through Pratt & Whitney factory-direct representatives.

SEND NOW FOR COMPLETE INFORMATION

P & J NEWARK Automatic Gear Hobbers and Spur Gear Cutters produce helical and herringbone gears, worm wheels and spur gears accurately and economically; they are easy to set up and operate. Several models are manufactured to handle a very wide range of work requirements. Product literature—including complete specifications and engineering data—is yours for the asking. Write on your Company letterhead direct to Pawtucket outlining your requirements . . . or simply phone the Pratt & Whitney Branch Office nearest you.

POTTER & JOHNSTON CO.

PAWTUCKET, RHODE ISLAND

SUBSIDIARY OF

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BRANCH OFFICES: BIRMINGHAM • BOSTON • CHICAGO • CINCINNATI CLEVELAND • DETROIT • LOS ANGELES • NEW YORK • PHILADELPHIA PITTSBURGH • ROCHESTER • SAN FRANCISCO • ST. LOUIS EXPORT DEPT., PAWTUCKET, RHODE ISLAND. AGENT: HOUSTON, WESSENDORFF, NELMS & CO.

PRECISION PRODUCTION TOOLING FOR MORE THAN FIFTY YEARS

The "Back Door" to Oil Control is important, too!

NEW "UNITIZED" MUSKEGON "SIDE SEALING"

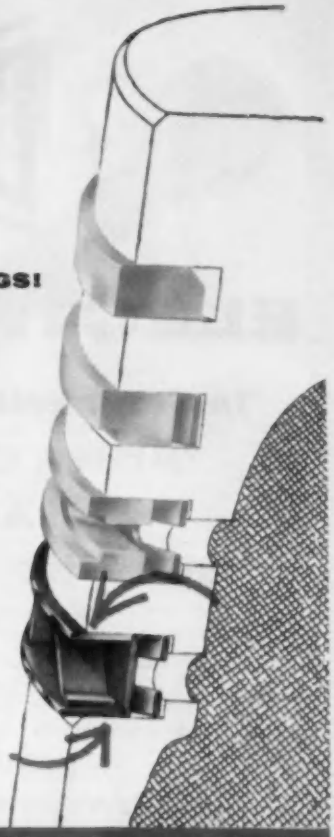
PISTON RINGS STOP OIL FLOW AROUND THE OIL RINGS!

Now, Muskegon offers three new "Unitized" chrome plated oil control ring designs to give better engine performance . . . better running economy. How? By providing the "side sealing" that's essential to modern, high compression engines.

Slow, stop and go driving, or down-hill driving create high vacuum in the intake manifold of new engines, causing the oil to be drawn around the piston rings up into the combustion chamber. This results in excessive oil consumption, plug fouling, lost power and unsightly tail pipe smoking. To prevent this, new engines need "side sealing" piston rings.

Muskegon's new designs incorporate a force causing the rails to "wedge" in the piston ring groove, *effectively sealing the sides* of the grooves against oil flow or seepage.

Muskegon's three new oil control rings also provide the same high quality and advanced characteristics found in all Muskegon piston rings. The edges are chrome plated for longer life. And, rails and spacer are "Unitized"! This exclusive Muskegon process binds the separate components of the ring together so they handle like a one-piece ring. This eliminates need for special installation equipment . . . provides error-proof, time-saving installation. During engine run-in, the bonding adhesive disappears, leaving the spacer and rails free to form a perfect seal with the cylinder wall and the piston ring groove.



AND THEY'RE ALL UNITIZED FOR FAST ERROR PROOF INSTALLATION

CSR-200-WE

This ring features an expander made from special steel with uniform bevels. The bevels create a "wedge" action between the rails of the ring, resulting in effective "side sealing" in the piston ring groove. The twin hump design provides excellent radial pressure, maximum support and full oil drainage. This ring provides "side sealing" at the lowest possible cost.

CSR-200-S

This ring has a wedge shim between the expander and the inside diameter of the steel segments. It is made of special material, beveled to create "wedging" action. This action provides 360° of uniform sealing and rail support. The design includes maximum radial tension to assure full oil drainage and long life. The action of the wedge shim expands out the pressure to provide maximum uniform radial pressure.

CSR-400

This ring has an expander integral with the "Unitized" spacer and rails. "Wedging" action is provided by forming the segment supporting "ears" of the spacer on an angle. This provides 360° of continuous, uniform "side sealing", and 360° of support for the segment. The flexibility of the segment with the eccentrocentral action of the expander assures maximum uniform radial pressure with maximum tension stability.

write today

for complete facts and samples.

DETROIT OFFICE

MUSKEGON Piston Rings

MUSKEGON PISTON RING CO.
MUSKEGON, MICHIGAN
PLANTS AT MUSKEGON AND SPARTA

Since 1921... The engine builders source!

DYNAMATIC

ELECTRONIC CONTROLS

in Conjunction with Dynamatic Eddy-Current Drives, Couplings, and Brakes, Provide Automatic Speed Control for a Wide Range of Industrial Applications

Basically, Dynamatic eddy-current electro-magnetic equipment is used to convert constant speed rotation into adjustable speed, or to produce constant speed rotation from a varying speed source. In a wide variety of industrial speed control applications, this equipment offers the advantages of rapid response, a wide range of stepless adjustable speeds, quiet operation, low power loss, low maintenance cost, and adjustable speed from an AC power source.

Dynamatic electronic controls with Dynamatic eddy-current equipment provide a simple, low-cost means of remote speed control for many specialized applications, such as pre-set multiple speeds, threading, inching or jogging, controlled acceleration, torque limiting, cascading, speed matching, and others.

To get the story of modern industrial speed control, send for your copy of Dynamatic's new illustrated Electronic Control Bulletin.

This New Electronic Control Booklet Covers Construction, Performance, Maintenance

Here's the story of Dynamatic electronic controls and their application to Dynamatic rotating equipment. Generously illustrated with numerous circuit diagrams. Contains valuable service hints. It's free—just ask for Dynamatic Bulletin EC-1.

EATON

DYNAMATIC DIVISION
MANUFACTURING COMPANY
3307 FOURTEENTH AVENUE • KENOSHA, WISCONSIN

PRODUCTS: Sodium Cooled, Poppet, and Free Valves • Tappets • Hydraulic Valve Lifters • Valve Seat Inserts • Jet Engine Parts • Rotor Pumps • Motor Truck Axles • Permanent Mold Gray Iron Castings • Heater-Defroster Units • Snap Rings Springtites • Spring Washers • Cold Drawn Steel • Stampings • Leaf and Coil Springs • Dynamatic Drives, Brakes, Dynamometers

Welding eliminated HERE

Welding operation required in two-piece construction was eliminated by cold heading bolt in one piece.

Roll threading permitted faster production at lower cost.

A manufacturer of power lawn mowers uses a bent eyebolt as a mounting brace to adjust the cutting height of the mower blades. The bolt was formerly produced by welding an eye forging to a bolt made on a screw machine . . . and then bending into the shape needed. National was asked how this bolt could be produced faster and at lower cost.

National's "Special Products Service" came up with a method of producing the bolt in one piece by cold heading and roll threading. In this way, the welding operation was eliminated and the manufacturer realized a lower unit cost. Thanks to National's wide range of cold heading equipment and specialized know-how . . . the same type of economy can be offered you.

Bring your "Special" problems to National

Do you have a fastener or a small part problem that can be solved by National's "Special Products Service"? Our representative will be glad to discuss your needs. Write for free copy of National's "Special" fastener booklet.

REPRESENTATIVES IN:

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THE NATIONAL SCREW & MFG. COMPANY

Cleveland 4, Ohio

Pacific Coast: National Screw & Mfg. Co. of Cal.
3423 South Garfield Ave., Los Angeles 22, Cal.

National PRODUCTS

Fasteners Hodell Chains Chester Hoists

Lubrication is automatic on Sundstrand's "Engineered Production" machine tools

FARVAL—
Studies in Centralized Lubrication
No. 182

The idea behind Sundstrand "Engineered Production" Service makes sense: Manufacturer and Sundstrand Engineers work closely together to find the best processing method for the job at hand. The result is the same as you experience with a custom-tailored suit—it fits.

FARVAL fits Sundstrand pattern

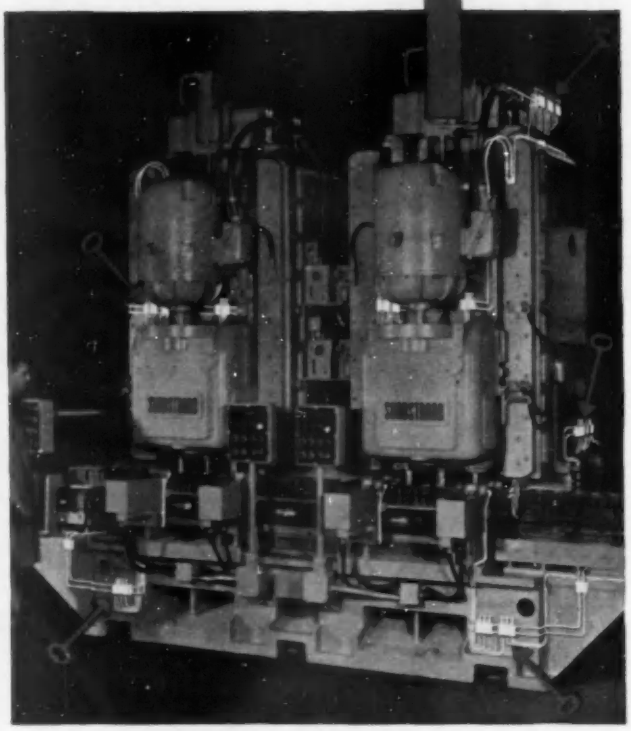
Farval Centralized Systems of Lubrication, like Sundstrand Machine Tools, are engineered for the job. Where there are bearings to be lubricated, Farval will make sure the job is done correctly. That's why Sundstrand chooses Farval—and why other machine-tool specialists are doing likewise.

It works like this: As *the* Dualine system of centralized lubrication, Farval delivers a measured amount of clean lubricant at regular intervals to *every* bearing in the Farval circuit. From a centrally located pump and reservoir, lubricant is pumped under pressure, to a measuring valve at each bearing. The exact amount of lubricant required by the bearing is delivered to it. And, indicators at every bearing show *positive proof* that each valve has functioned.

Let Farval help you

Lubrication problems that seem tough for you are a cinch for Farval. One of our lubrication engineers will be glad to inspect your plant and present a written analysis of what Farval can do for you. This service is without obligation, of course. If you'd like the complete Farval story, just write for Bulletin 26-R. The Farval Corporation, 3296 East 80th Street, Cleveland 4, Ohio.

Affiliate of The Cleveland Worm & Gear Co., Industrial Worm Gearing. In Canada: Peacock Brothers Limited.



This is a Sundstrand two station rough boring unit for 6 cylinder engine blocks.

KEYS TO ADEQUATE LUBRICATION—Wherever you see these Farval valve manifolds, dual lubricant lines and central pumping station, you know a machine is being properly lubricated.

News of the MACHINERY INDUSTRIES

By Thomas Mac New

Machine Tools Made in U.S.A. Will Be Used To Equip New Assembly Plant for Volkswagen Automobiles in New Brunswick, N. J.

Volkswagen to Buy American Tooling

Volkswagen engineers have already been sent to the U. S. to plan the tooling for its new assembly plant at New Brunswick, N. J. We are given to understand that a preliminary survey is underway to check the availability of machine tools and allied equipment and that all offers from American machine tool builders will be carefully examined.

A company spokesman from the Wolfsburg, Germany, factory told AI's European correspondent that "Due to the high standard of the U. S. machine tool industry, the majority of the machine tools required for the new assembly plant will be purchased in the U. S." This company executive believes that the Volkswagen requirements as to *quality* and *price* will be met by American builders without any difficulty.

Volkswagen already has assembly units in Canada, Australia, New Zealand, South Africa, Eire and Belgium. Output of cars from these plants is expected to replace part of the direct exports from Germany at an increasing rate. Total exports from Wolfsburg will continue to grow, although constituting a reduced proportion of an expanded production which is scheduled to reach a daily output of 1000 cars and 300 trucks and buses by the end of next year.

Ball Bearing Conference On Electric Motors

New Departure Div., General Motors Corp., will sponsor an Electric Motor Ball Bearing Conference November 2 and 3 in Hartford, Conn., to which top management and engineering personnel of the electric motor industry are being invited to participate.

In announcing plans for the two-day conference, Paul W. Rhame, New Departure's general manager, described the basic objectives of the event as follows: (a) to develop mutual understanding and knowledge of the engineering problems of today and tomorrow as related to the application of ball bearings in electric motors; (b) discuss concrete ideas for solving these engineering problems; (c) increase electric motor ball bearing engineering knowledge and experience of the conference participants.

Included in the two-day program will be a series of panel discussions relative to functions of ball bearings in electric motors, a tour through manufacturing and engineering facilities of New Departure and other events.

The November conference will mark the second program of this type conducted by New Departure this year. A similar one, devoted to engineering subjects as they relate to ball bearings in the machine tool industry, was attended by more than 200 last February.

AIA Sets Milling Machine Standards

According to the Aircraft Industries Association, new milling machines for aircraft industry plants will step up production of certain parts of airframes as much as eight to 10 times the present rate. This will be possible, says AIA, because the plane manufacturers will be working with equipment made for aircraft production. Rather recently the AIA released standards for milling machines as approved by the industry. The AIA lists the following 10 items which state how the program will be beneficial to the industry:

Provide greatly expanded mobilization capacity.

Greatly reduce lead-time on certain integral parts.

Provide for interchangeable tooling, permitting the same parts to be produced on the different machines.

Broaden the production base by having standard machine specifications applicable to all aircraft plants.

Reduce manpower, although in some cases creating a need for more skilled workers.

Reduce the cost of aircraft.

Reduce handling time of parts being worked.

Cut floor space needed and the number of machines required.

Make stockpiling of machine tools more feasible.

Make possible the machining of the newer alloys at greater speeds.

P&W Again a Corp.

L. D. Silberstein, president and chairman of the board of Penn-Texas Corp., has announced that the assets and business of Niles-Bement-Pond Co., recently merged into Penn-Texas Corp., have been transferred to a newly formed corporation to be known as Pratt & Whitney Co., Inc. It is a subsidiary of Penn-Texas, with Alexander H. d'Arcambal president and general manager.

Mr. Silberstein stated that the name of Pratt & Whitney Co., Inc. was so chosen both because the Pratt & Whitney Division was the primary operating unit of Niles, and because the name "Pratt & Whitney" has been associated with machine tools, cutting tools, and gages for almost a century.

He also announced that Chandler-Evans will be operated as a division of Pratt & Whitney Co., Inc., with Sidney A. Stewart as manager; and that Potter & Johnston Co., of Pawtucket, R. I., will be become a direct subsidiary of Pratt & Whitney with Edward P. Gillane, president and general manager.

The following are the directors of Pratt & Whitney: Richard W. Banfield, Oscar L. Chapman, Alexander H. d'Arcambal, Duncan M. Findlay, Seymour M. Heilbron, Alexander S.

(*Turn to page* 130, *please*)

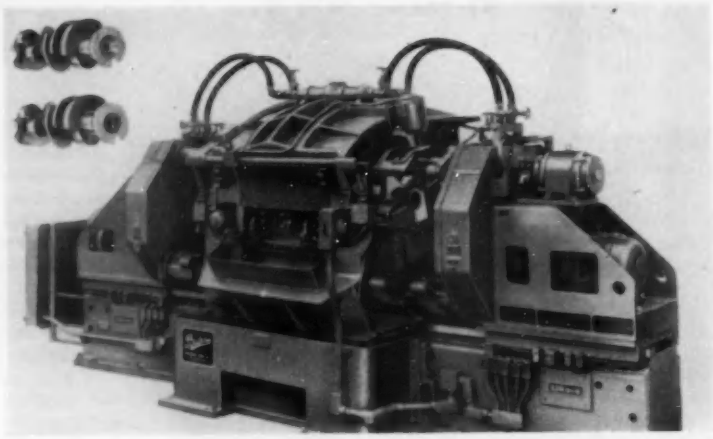
NEW PRODUCTION and PLANT EQUIPMENT

FOR ADDITIONAL INFORMATION, please use reply card on PAGE 97

Drills Crankshafts

THIRTY-FOUR operations on 70 pieces per hour at 100% efficiency are performed on Plymouth engine crankshafts by this machine. It performs 30 operations from the left-hand side and four from the right. Features include Powerflo indexing, power clamping of fixtures by means of a power wrench with torque control, multiple heads of master-gear-box construction with individual cluster heads. Bushing plates register into fixtures at each station.

The 30 operations from the left-hand side include, station by station, these operations—drill one 27/64 in. hole, one 57/64 in. hole and seven 7/16 in. holes; face center hole to 30 deg angular seat and drill to 27/32 in., countersink eight holes; ream seven 0.4533 in. holes, one .9085/.9090 in. hole to depth and one 0.4402 in. hole; countersink one hole to 60 deg included angle. Operations performed on the right-hand side are—drill one 1-1/16 in. hole, spotface one 1⅝ in. hole, counterbore one 13/16 in. hole and form 60 deg seat.



Buhr Economatic machine for drilling crankshafts

All parts are completely interchangeable. Each component assembly is located by precision-bored dowels. Other features include electrically-controlled index; hardened-and-ground laminated tool-steel ways which are automatically lubricated; and all multiple heads of ball-bearing construction with shaved gears and broached-and-splined drives. *Buhr Machine Tool Co.*

Circle 55 on postcard for more data

Positions Work on Vertical Machines

The Micro-Positioner is an automatic method of accurately locating production parts under all types of vertical spindle machine tools. Jigs or fixtures are eliminated on limited production quantities. Tolerances within 0.0003 in. can be held when required, according to a company spokesman. The positioner table is controlled by a steel tape indented by an automatic marking device from information on blueprints or by locating the machine tool over a previously marked part. Subsequent production can be run by push-button controls on a master console. (Topp Industries).

Circle 56 on postcard for more data

Feed Rate Meter

ACCURATE readings of the speed of travel of cutting tools, carriages, and heads in low speed turning, boring and grinding operations is provided by a feed rate meter. It consists of two parts, the pickup unit and the indicating unit. The pickup unit is easily mounted horizontally or vertically, so that movements of the machine push a ⅜-in. drill rod through bearings in the unit. The speed of travel of the rod, which turns a calibrated magnetic drum, is transmitted to the portable indicating unit via vinyl-covered cable. The speed rate is then read directly from the large calibrated dial. Speeds are indicated from a fraction of an inch per minute up to 5, 10 and 20 ipm.

A remote indicator, or one indicator with any number of pickups, can be used. Overspeed or rapid acceleration will not damage either the pickup or the indicator unit. *Maico Co.*

Circle 57 on postcard for more data

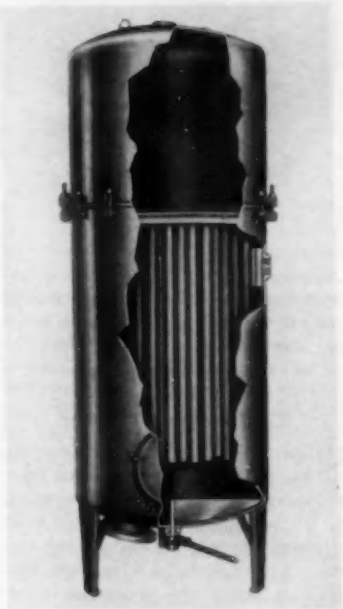
Chrome Plating Aid

KROME-ON, liquid addition agent, according to performance data reported by platers using the additive, can materially increase the throwing power of chromium plating baths. It also furnishes a superior mist-inhibiting blanket to reduce spray and flue loss. Reduced drag-out also minimizes waste disposal problems. *Wagner Brothers.*

Circle 58 on postcard for more data

Filter

MANUAL cleaning is said to be eliminated by a backwashing feature built into the Pre-Coat Filter, designed for mounting on a central coolant system tank. The unit provides high flow filtration for water-based or mineral oil coolants used in drilling, honing, and lapping. A circular steel plate divides the filter body into two sections. Above is a clean coolant



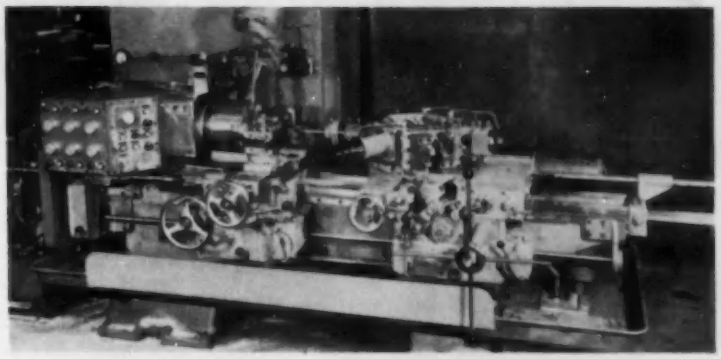
Pre-coat coolant filter

dome; below, 199 perforated filter tubes suspended vertically. Use of tubular screens rather than flat screens is claimed to reduce tank diameter 30 percent without sacrificing filter surface area.

Screens are first coated with diatomaceous earth. In normal operation, one pre-coat is needed daily.

During the filtration cycle, all solid particles are removed and held on the coated screens as coolant passes upward through the tubes. To reach the outlet at top of filter, coolant must pass through a dome section. The filter's self-cleaning feature works on a simple gravity principle. Constant pressure keeps the dome filled with clean coolant. When contamination on tube surfaces becomes thick enough to impede passage of coolant, the pump is stopped. This reverses the flow, sending a backwash of clean coolant from the dome down through the tubes. *Houdaille-Hershey of Indiana, Inc.*

Circle 59 on postcard for more data



J & L universal turret lathe

Saddle Type Turret Lathe

JUST introduced is a universal saddle type turret lathe, featuring a so-called Hydra-Clutch headstock. It also has a motor-indexed Geneva hexagon turret, with pre-selected spindle speeds for each position.

The new 32-speed headstock has two ranges, each with 16 forward and reverse speeds powered by a 40-hp single speed motor. Spindle speeds within each range can be changed at any time without stopping the spindle by a pre-selector switch with push button control. These changes are accomplished through solenoid valves which engage or disengage hydraulically operated multiple disk clutches.

Automatic speed selection and change is provided for each face of the hexagon turret by means of a secondary panel having six pre-selector switches. Speeds so obtained can also be changed at any instant by a master pre-selector switch and push button.

All conventional headstock controls are by switch or push button. These include start and stop motor, start and stop spindle, spindle jog, and direction of spindle rotation. High and low speed ranges, also free spindle position are manually selected by lever-operated sliding gears while the spindle is stopped.

The Hexagon Turret is indexed, in one direction only, by a separate motor through a Geneva mechanism. Buttons on a control spool determine the skip or stop positions. Indexing is by power only and takes place automatically after the turret has been returned in fast motion to contact the adjustable index stop bar.

Basic spindle speeds available for the 2½ in. hole spindle are a low range of 30 to 527 rpm and a high range of 89 to 1542 rpm. Six additional range groups are available by accessible change gears providing a total spread of 18 to 2550 rpm. The 4½ in. hole spindle has a basic low range of 20 to 341 rpm and a high range of 58 to 998 rpm. Additional change gears provide a total spread through six groups of 10.5 to 1491 rpm. *Jones & Lamson Machine Co.*

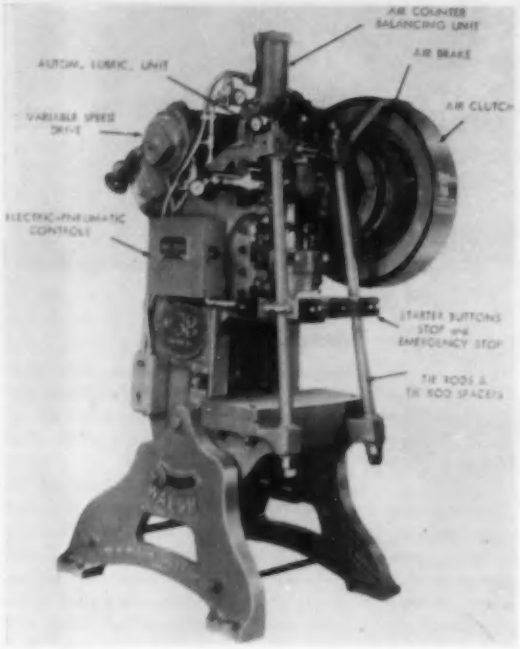
Circle 60 on postcard for more data

Novel Thermometer Dial

DEVIATIONS in temperature from the normal reading are easily seen from a distance, on the Signal Eye-equipped bi-metallic thermometer. A bright red disk is attached to the pointer, while a white disk is attached to the dial glass at the normal temperature. As the pointer moves away from normal, the red spot becomes progressively more visible, warning the operator who may be too far away to see the pointer itself. *W. C. Dillon Co.*

Circle 61 on postcard for more data

Air Clutch Added to Press Line



Among the new features of a line of OBI presses is an air clutch, which also can be installed on any of the firm's presses with a pin-type clutch, without replacing the crankshaft. Electric-pneumatic controls provide for inching, single stroke or continuous operation, at high or low speeds. (Walsh Press and Die Co.)

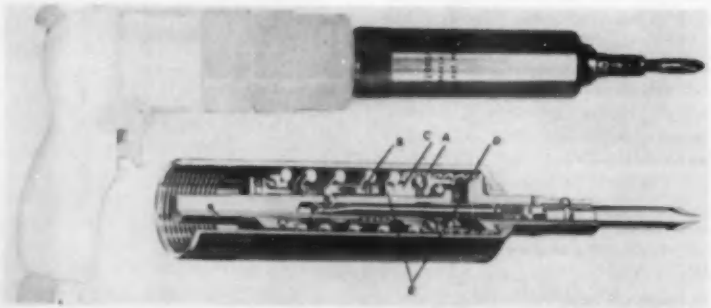
Circle 62 on postcard for more data

Clutch for Power Screwdrivers

A TORQUE control clutch for power screwdrivers features a frictionless, ball bearing principle. The torque limiter assures torque control and accuracy, with or without lubrication. Completely automatic in its operation by the use of a sequential clutch arrangement, it drives as a solid member, then goes into a complete free wheeling when the proper predetermined torque is reached and stays in free wheeling until it is released from the work. The clutch re-engages the torque sensitive mechanism when it is removed from the work, but after the front bit holder engaging blocks are disengaged.

The limiter cannot be influenced by the operator, and negative angle engaging blocks prevent accidental release due to relaxing of pressure by the operator or fluctuating power pressure. The limiter is always completely re-engaged and ready for instant action even when the operator works with the power on continuously between operations or goes onto the work with a "dead" motor. The limiter can be used on any available power source, from hand tools to automatic multiple-spindle drills. It has a positive, accurate torque range of five to 85 in.-lb and is easily adjusted to the desired torque. *Livermont, Inc.*

Circle 63 on postcard for more data



Livermont torque limiter. A—ball bearing principle. B—clutch. C—torque sensitive mechanism. D—front bit holder engaging blocks. E—negative angle engaging blocks.

Machine Mount

WESTSORB adhesive-coated felt mounts for use under machinery are now being offered to reduce noise and vibration. They are adhesive-coated on both sides, to permit quick installation or re-location of equipment without bolts. The wool felt is resistant to oil, grease and acids. It is designed to hold up well under repeated impact loads. It is available in several thicknesses, cut to size or in flat sheets. *Western Felt Works.*

Westsorb felt machine mount

Circle 64 on postcard for more data

Centerless Lapper

SEVERAL improvements in a centerless lapping machine have been announced. Adjustment and spacing of the roller is said to be easier with the new fine adjustment locking device. A hold-down lever requires less pressure on the workpiece. A so-called back height adjustment enables the operator to tilt the machine forward to a convenient work angle.

Maintenance is simplified, since needle roller bearings are used on the rolls. They can be dressed in place while the machine is operating. No grinding is required with the new dressing device. The dressing device produces a cross-hatch finish which eliminates break-in time. *Size Control Co.*

Circle 65 on postcard for more data

Press-Welder Assembles, Welds Coupling Parts

THE Triaxial Welder production welding machine combines assembly and argon shielded-arc welding operations. One operator can assemble and weld two eight-in. diameter sheet metal fluid coupling parts at a rate of 300 finished assemblies per hour.

The machine consists of a special vertical hydraulic assembly press and three standard argon shielded-arc welding heads. These welding heads are positioned at 90-deg locations around the assembly press. The welding operation is performed on two fixtures while parts are being assembled in a third fixture by the press. To accomplish this, three automation devices transfer the fixtured and assembled part to the welding head, rotate the fixture and part at a speed of 90 ipm for the welding operation, and return the fixture and part to pressing position for unloading.

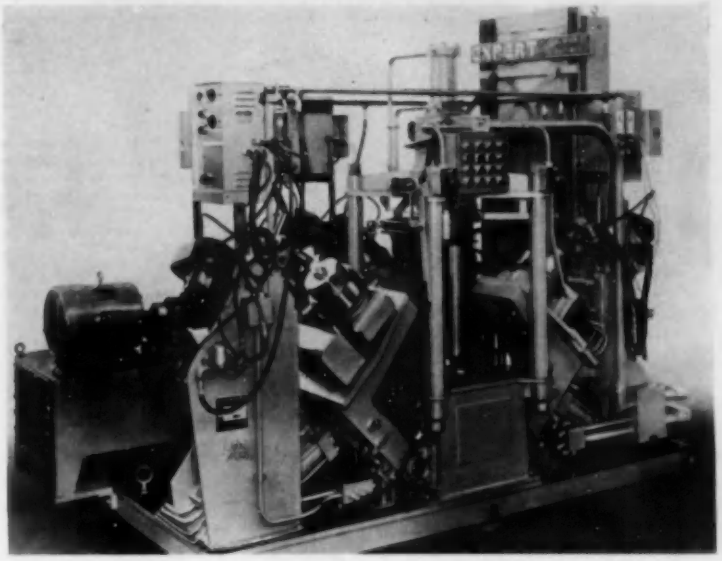
Hydraulically controlled pivoted fixtures provide the required transfer and rotation movements. Individual hydraulic cylinders control the motion of the fixtures in and out of the press. Hydraulic motors rotate the assembled part and fixture as a unit during the welding operation.

With one of the automation fixtures resting on the platen of the hydraulic press, the operator places the parts to be assembled in the fixture. Then he simultaneously depresses two cycle control buttons and the press ram comes down and presses the two parts together. When the press ram returns to top position, the fixture is tilted back out of the press at a 45-deg angle where the part assembly is rotated under the welding head and welded by the argon shielded-arc process.

As soon as any one fixture is tilted out of the press station, the fixture on which the welding operation is next completed is tilted into the press station where the finish welded assembly is removed and the fixture again loaded for the assembly operation.

While any one of the three fixtures is in the press station for unloading, reloading, and pressing, the other two fixtures are making their welds in their individual weld stations.

A separate hydraulic power pack supplies power for all control and operating functions. Separate electrical and welding control panels are provided. Individual operating buttons are provided for each fixture. Panel lights indicate the operating condition of each automation fixture. All fixtures are separately and independently operated, permitting the machine to continue to produce parts while one or two of the fixtures is locked out for maintenance. *Expert Welding Machine Co.*



The new Expert Triaxial Welder that assembles and welds two sheet metal fluid coupling parts together.

Circle 66 on postcard for more data

Welding Control

RESISTANCE welding controls featuring printed circuits and a weld-safe circuit for the protection of equipment and work in process is available. Circuit components and tubes have been reduced to the minimum to reduce panel weight by 30 per cent.

The weld timer and sequencing circuit is designed to lock out welding current should tube failure occur at any time.

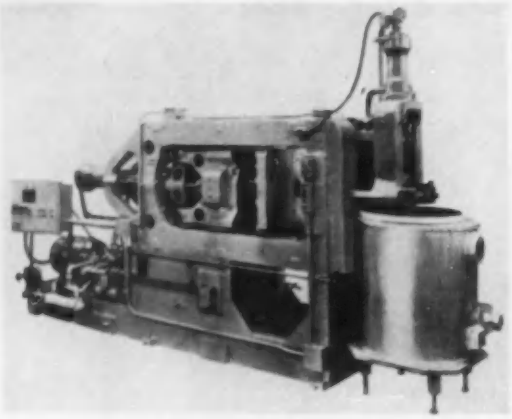
All component locations and ratings are printed on the front of the panel to facilitate inspection and servicing. Components can be removed or replaced with conventional soldering methods. Heavy duty, long life components are used for maximum operating life. Capacitors, for example, are rated at 600 v even though circuit voltages are normally 115 v. The ignitron tubes are protected from excessive operating heat by a thermostatic switch snap mounted on the outer water jacket, which locks out welding current at a preset temperature. The inside sheet of the water jacket is constructed so that thermal contact with the thermostat is maintained. Available as auxiliary equipment, a water saver kit includes a second thermostatic switch for mounting on the second ignitron tube. *Westinghouse Electric Corp.*

Circle 67 on postcard for more data

Air Compressor

A MOBILE high-capacity air compressor has been developed for the aircraft industry. The two-engine, two-stage air compressor will supply up to 150 lb per minute at 50 psia and 500 F. Designed for ground support of jet aircraft using turbine starters, the 300 air hp compressor provides air for checkout as well as starting. It is not limited to short full-rated flows strictly for starting, but can be used for supercharging airplane cabins and cooling radar. *Highland Engineering Co.*

Circle 68 on postcard for more data



The first of these Lester die casting machines is being used by an automotive supplier to cast a large area, multi-cavity die at an average rate of 280 shots per hour.

Features of 600-Ton Die Casting Machine

THE HP-3Z-SF 600-ton zinc die casting machine is designed to cast up to 15¼ lb of zinc or proportionate weights of lead or tin.

Only one adjustment is required to set up the zinc end correctly, as the entire shot system is located in machined slots in a one-piece yoke. Furnace and melting pot are easily fed or emptied and independent of the machine itself. Both shot speed and pressure are adjustable, with an ASME-approved nitrogen accumulator giving high speed injection. The plunger tip is heat-treated steel with piston rings. Two fixed shot positions are provided.

The one-piece alloy steel frame, with beam area equal to eight-in. tie bars, insures permanent parallel alignment of the platens. Die set-up is implemented with a single hand crank die height adjustment. Die opening is 14 in. The movable platen, completely unobstructed, is 40 in. wide, with a vertical clearance between the beams of 28¼ in. It is supported on hardened steel gibs. A 26 by 42-in. opening in the top of the frame is provided. High speed double toggle linkage in multiple shear, bolstered by the large diameter adjusting screw, gives solid backing to the dies. Completely exposed hydraulics meet JIC standards.

The pumping system uses a 20-hp motor. Timed casting ejection, provided by the central hydraulic ejectors, is optional at extra cost. *Lester Phoenix, Inc.*

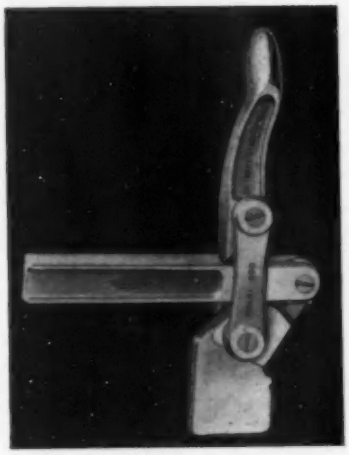
Circle 69 on postcard for more data

Toggle Clamps

REPLACEABLE forged alloy components are a key feature of two 4000-lb pressure toggle clamps being announced. Any part can be replaced with the use of a screwdriver. Fasteners are threaded pivot rods and serrated bushings. Pivot rods are all hardened and ground. The alloy steel forgings can be welded or machined as required, and the holding bar is milled top and bottom.

Model 557 is recommended when overhead clearance is limited. Model 558 features an upright handle where clearance is adequate. *Detroit Stamping Co.*

Circle 70 on postcard for more data



DE-STA-CO model 557 toggle clamp

Bumper Guard Welder Features Dial Feed

Sciaky dial feed rotary indexing machine for bumper guards. Production is 1000 per 50 min.

ROTARY indexing has been provided with a standard single phase weld-machine. The six station air operated projection welder operates at 150 kva at 50 per cent duty cycle. Electrode force is 4800 lb at 80 psi. Functions include squeeze, weld, quench, post-heat, hold.

The bumper guard mounting bracket is placed over a locating pin and sprung-held. The hold-down is depressed in loading the bumper guard shell. At the welding station both parts are pressed into final location by air, and weld pressure is applied by the vertical yoke. Both sides are welded at once. The yoke assembly floats in relation to the table to equalize pressure. *Sciaky Bros., Inc.*

Circle 71 on postcard for more data

Tests Harnesses

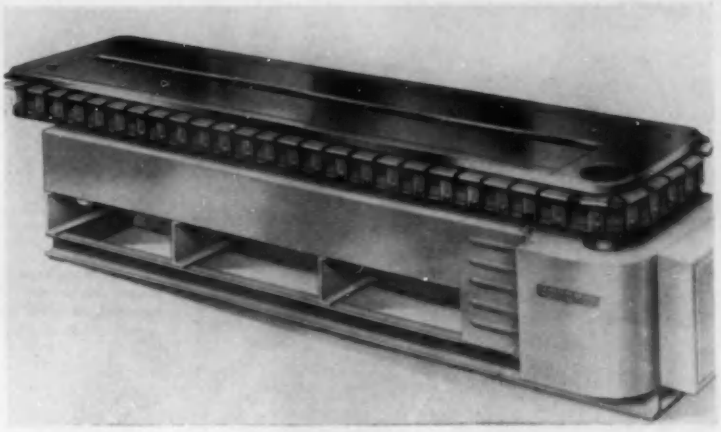
A UNIVERSAL harness tester is designed to provide an accurate check of continuity, insulation resistance, interlead shorts and shorts to ground in the electrical control harness of turbojet engines. The device consists of a low and a high voltage test circuit, switches and controls for applying these potentials to the cable being tested and lights which indicate proper or faulty operation. Controls and indicating lights are mounted on an insulated instrument panel, and a plug panel is provided on the back of the console for connecting the harness. Large casters permit easy movement. *Greer Hydraulics, Inc.*

Circle 72 on postcard for more data

Solvent Cooler

To help in solving difficulties of overheated solvents in industrial processes, there has recently been developed a low-cost heat exchanger, operating through the use of cool water, to reduce the temperature in any critical liquid to the point best suited for efficient operation. Since the manufacturing processes vary so greatly in different plants, and since no two temperature problems are exactly alike, it is suggested that persons interested write direct to the *Vic Machine Co., Attention of the Industrial Dept., Minneapolis 3, Minn.*

Circle 73 on postcard for more data



Auto-Tran transfer machine chassis can accommodate hopper feeders

Chassis for Indexing Transfer Machine

A TRANSFER-TYPE, basic machine chassis in a wide range of standard models has been added to a series of standard indexing units. The Auto-Tran straight-line type indexing chassis provides a standard unit for application to both automatic and semi-automatic assembly operations. It is, however, designed with accessible faces for mounting various types of operational devices for drilling, tapping, staking, etc. The unit is offered with 48 to 72 carriers; 3, 6, 9 or 12 in. index travel, and with either vertical or horizontal mounting surfaces.

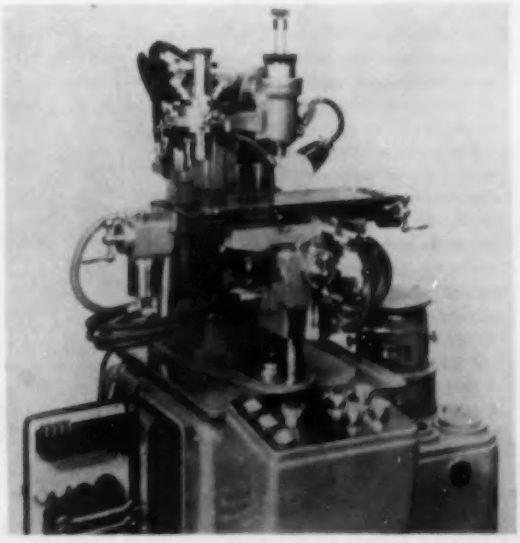
Work carriers, attached to a double roller chain, have ball bearings mounted in both horizontal and vertical planes, guided in tracks mounted on the chassis frame. A smooth index is provided by a cam indexing unit which drives a sprocket incorporating a pin clutch. This feature provides easy alignment of operational devices and tooling. A Warner electric clutch brake, with standard electric motor drive, provides flexibility in operational cycle control. *Swanson Tool & Machine Products Co.*

Circle 75 on postcard for more data

Three-Dimensional Miller Is Automatic

TRACEMASTER, a fully automatic profile milling machine, can be used for three dimensional automatic copy milling of dies, forging dies, plastic dies, etc., rubber and glass moulds, turbine blades and all work pieces of irregular shape. The Hydrotracer copying valve controls from a master rise and fall of the knee and also the speed of the table traverse. The speed of these movements is set by hand controls. The Hydrotracer will provide a constant rate of feed relative to the form being copied and will allow cavities with vertical faces to be copied automatically with complete safety and high accuracy. The table is reversed at the end of each stroke by adjustable stops. It has automatic infinitely variable cross feeds of 0.005 to 0.250 in., and uses Vickers hydraulic unit. *Wickman Products Corp.*

Circle 74 on postcard for more data



Cutters up to ½ in. in diameter can be used on the Tracemaster.

NEW PRODUCTION and PLANT EQUIPMENT

Vickers T-8 package hydraulic power unit with pipeless manifold design

Package Power Units

OIL-HYDRAULIC pipeless power units featuring compactness, design flexibility and manifold mounting of control components now are available. They are designed to meet requirements of a wide range of light duty industrial applications, such as clamping, indexing and transfer operations.

Series T8 pipeless packages conform to JIC recommendations and include electric drive motors meeting new NEMA frame size specifications. They are recommended for use with systems requiring operating pressures up to 1000 psi. Pumps and valves on the new units are directly connected to a common manifold mounting panel, eliminating all external piping on the power unit itself and minimizing both maintenance and the possibility of leaks.

The units consist of an electric drive motor, an oil-hydraulic pump and a control circuit, mounted on an eight-gal reservoir. A wide variety of performance characteristics can be achieved through appropriate selection of drive motor, pump and circuit options.

Three pump capacities available are 2.2, 3.7 and 5.2 gpm rated deliveries at 1800 rpm and zero pressure. A choice of three electric drive motors rated one, 1½ and two hp at 1800 rpm in combination with the three pump options provides flexibility.

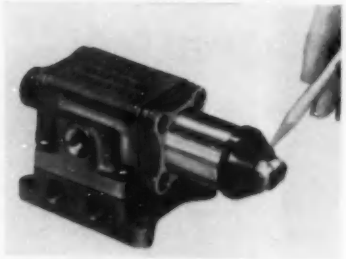
Three control circuits are available. Circuit type 1 consists of the pump and a relief valve which provides adjustable overload protection up to 1000 psi. Circuit type 2 consists of pump, relief valve, a solenoid-controlled pilot-operated directional valve, and a cartridge type check valve for development of pilot pressure. The check valve is built into the manifold mounting panel. Circuit type 3 consists of pump, relief valve, two directional valves and a pilot pressure check valve. A wide range of performance characteristics can be achieved with the many directional valve options available. Seven spool configurations, three spool positions, and six spool control modifications for varying rate of valve response permit many combinations to meet a multitude of performance requirements. *Vickers, Inc.*

Circle 76 on postcard for more data

Cam Valve

A HEAVY-DUTY cam valve with larger cam roller and cam plunger is being introduced. The plunger spring is loaded to take care of overtravel on stroke. All working parts are completely sealed by means of a synthetic boot and otherwise sealed against external contaminants. The cam roller is a completely sealed precision ball bearing. Designed especially for foundries, it is ideal for any applications where sand, dirt or dust are present, according to the company. *Mechanical Air Controls, Inc.*

Circle 77 on postcard for more data



MAC model 2051, ⅜-in. four way cam valve

Mesh Belt Conveyor

HOT or cold material can be handled on steel wire mesh conveyor belts in a new line. Low end of the conveyor, on casters, is adjustable from eight to 20 in. from the floor; upper end height ranges from 32 to 72 in. depending on length. The angle of incline is 30 deg.

Belt and side guides are replaceable. A variety of weaves and cleats are offered, as well as various motor voltages. *Campbell Machines Co.*

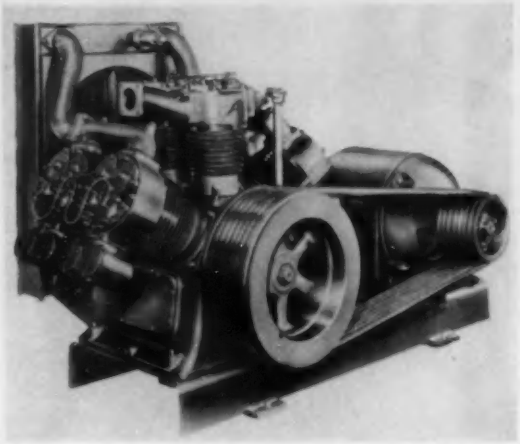
Circle 78 on postcard for more data

Campbell-Veyor conveyor of steel wire mesh.

Metal Cleaner

ROLLENE E. C. emulsion cleaner for ferrous and non-ferrous metals was developed for removing foreign substances from metal sheets prior to processing of finished product in stamping plants. The material is used in circulating systems and is readily soluble in hot or cold water. A 9 to 1 solution with tap water makes a stable cleaning solution. The film is deposited on the sheet which is non-corrosive and acts as an aid in drawing operation. The nature of the material tends to eliminate roll slippage on press feeders, reducing loss of steel caused by short lengths. The material is non-toxic and non-corrosive. *Brooks Oil Co.*

Circle 79 on postcard for more data



Le Roi three-cyl air compressor line features balanced design.

Weighs, Balances Pistons

FED and unloaded by conveyors, a piston balancing machine automatically receives, weighs, sorts, positions, clamps, machines and discharges internal combustion engine pistons at production rates to 720 pieces per hour. It maintains piston weights uniformly to tolerances of plus or minus one gram. It also tests each piston for proper machining position, refusing to accept pistons received in inverted positions.

Pistons are automatically weighed. Grossly overweight and underweight units are automatically rejected from the machine. Pistons within the gross weight limits are weighed a second time. The machine automatically determines the amount of metal to remove from the trim pads. *Morris Machine Tool Co.*

Circle 80 on postcard for more data

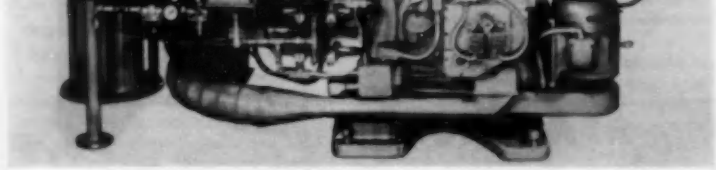
Two-Stage Compressor Line

TWO-STAGE, air-cooled, electric motor-driven compressors of 50, 75 and 100 hp stationary compressors have displacements of 260, 415, and 550 cfm at 125 psi operating pressure.

For applications where compactness, light weight and a minimum of operator attention are required, the new three-cyl 50S2 and six-cyl 75S2 and 100S2 compressors have a balanced design which reduces vibration and noise to a minimum. This prevents wear of both compressor and motor and lessens operating noise. Cylinders are made of alloy iron and are cooled by a high-speed, belt-driven fan which draws air through a sectional-core intercooler and directs air over the cylinders and heads. Air cooling allows installation of the "S" compressor without fear of interruption in the flow of water or freezing of water lines. Each bank of cylinders has individual intake filters. Forced feed lubrication is provided by a positive plunger type oil pump.

Standard equipment includes a dual control. This control gives the operator a choice of start-and-stop duty of both motor and compressor or a continuous running of motor with intermittent compressing. The latter selection permits the compressor cylinders to unload instead of compressing when desired pressure is reached. *Le Roi Div., Westinghouse Air Brake Co.*

Circle 81 on postcard for more data



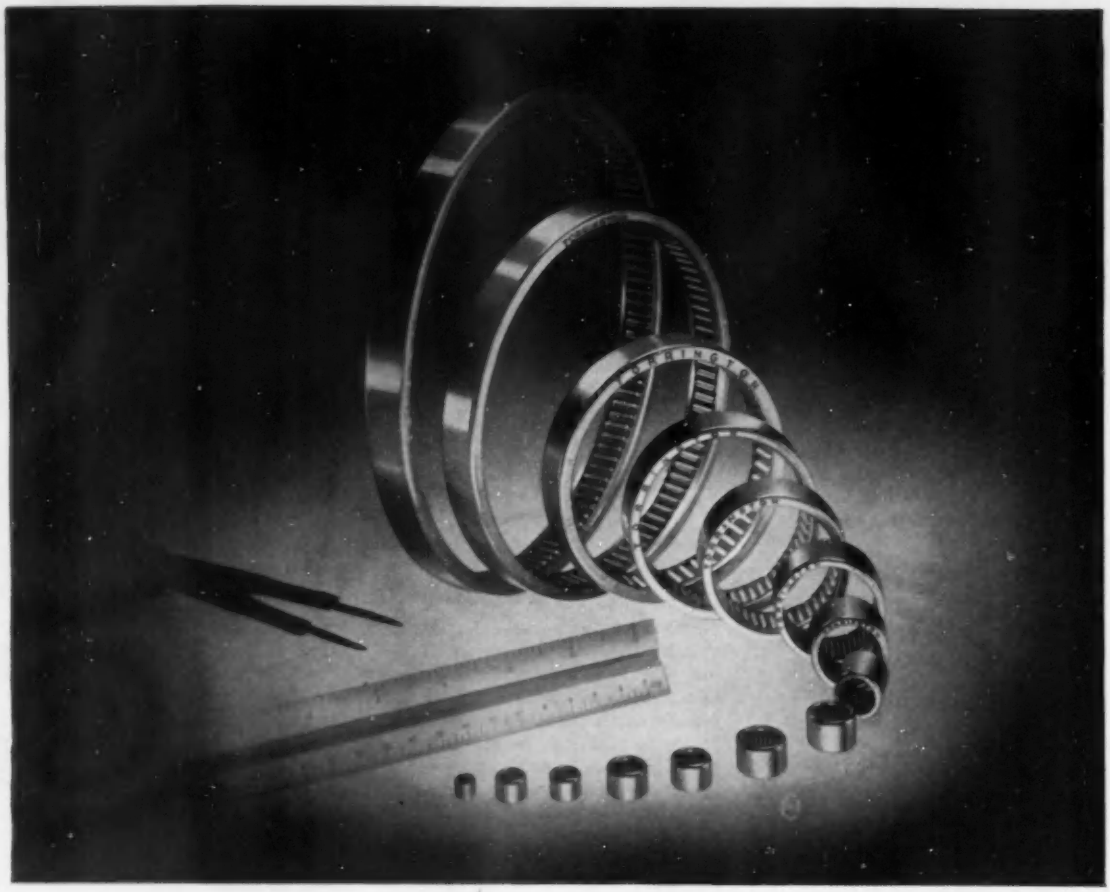
Morris piston balancing machine features electronics cycle control

Larger Spline Roller

EXPANSION of the Roto-Flo spline roller series to include a model capable of cold-forming splines and other shapes up to two in. diameter is announced. Model 1551 is the third in the Roto-Flo line that now spans a part diameter range of ½ to two in. with face width up to 4½ in. The new model forms toothed and grooved shapes on shafts by rolling the piece between two parallel-acting racks. Except for the larger proportions, the new machine is similar in appearance and performance to the others in the line. Model 1551 may be automated if desired.

The overarm or tail stock for the new machine is universally adjustable for parts ranging in lengths from 12 to 36 in. *Michigan Tool Co.*

Circle 82 on postcard for more data



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The Torrington Needle Bearing is produced in a wide range of sizes—for shaft diameters from $\frac{1}{8}$" to $7\frac{1}{4}$"—to meet the needs of the thousands of products throughout industry in which it has become standard equipment.

Whatever the size, the basic design is the same—a full complement of free running rollers, without separators or cages, retained by a thin hardened outer shell which serves as the outer race. This means a greater radial load capacity for its size than any other anti-friction bearing, plus compactness and long, maintenance-free operation.

Several widths are available in each size to meet specific design requirements, and they are also made with one end closed for use over stub shafts.

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- compactness and light weight
- runs directly on hardened shafts
- permits use of larger and stiffer shafts

Free INFORMATION SERVICE

Use either of these postcards for Free Literature listed below, or for more information on New Production Equipment and New Products described in this issue.

USE THIS POSTCARD

FREE LITERATURE

Shaft Machines 1

A full line of flexible shaft machines for die finishing and other uses is cataloged in a 24-page booklet on the Kellerflex line. *Pratt & Whitney Div., Niles-Bement-Pond Co.*

Press Feeds 2

An extensive collection of catalog sheets on automatic feeds for punch presses includes data on roll feeds, straightening machines, hopper feeds, reels, hooks, feeding machines, oilers, air accessories and dial feeds. *F. J. Littell Machine Co.*

Induction Heater 3

A new bulletin describing the 30-kw induction heater for the metalworking industry is offered. The unit can be used for hardening and heat-treating operations, metal joining, hot heading and forging. In addition to complete control and output facilities, a description of the work station housing for all components such as output transformers, capacitors, plumbing for quench and cooling water, contactors and timers is presented. Bulletin 85-875. *Westinghouse Electric Corp.*

Feed Units 4

A single page flyer is now available covering data and specifications of way type hydraulic feed units, which feature thrust above the ways near the tool load. *Hartford Special Machinery Co.*

Elastomer Data 5

The first issue of Facts About Hypalon briefly describes this thermosetting chemical rubber, details some of the outstanding attributes of this elastomer. It also includes a case-history account of how a new type of acid hose featuring a tube of Hypalon has already outlasted regular acid hose by four times in chromic acid service and is still going strong. *du Pont, Elastomers Div.*

Three-Phase Welding 6

An explanation of its patented three-phase principle of welding is given in bulletin 332-10. *Sciaky Bros., Inc.*

Cylinders 7

Catalog 101A, 28 pages, contains detailed specifications and sectional drawings of cylinders for air, hydraulic or water operation. *Ortman-Miller Machine Co.*

Silicones 8

Listed in a four-page catalog are the various silicones, in liquid and solid forms, in the broad categories of water repellents; oils and oil emulsions; electrical insulating resins; silicone rubber gum stock and compounds; and silicones which make excellent anti-spatter, anti-foaming materials, etc. *Linde Air Products Co.*

(Please turn page)

VOID After Dec. 15, 1955 10/15/55

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41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
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Rotary Machines 9

Hand and power operated rotary machines, rolls and accessories are concisely described in bulletin 75-B. Included are deep throat and throatless combination machines, deep throat beading machines, throatless crimping and beading machines, setting down machines, double seamers, elbow seam closers and accessories. *Niagara Machine and Tool Works.*

Airfoam for Fire 10

Just published is a 36-page booklet that gives detailed information on all types of Foamite airfoam equipment for industrial fire protection. *American LaFrance Corp.*

Metal Chilling 11

Shrink-fit assembly of metal parts, metal treatment through chilling, gas dehydration and metal and material testing are a few of the industrial operations performed by chilling equipment and test chambers described in a new 12-page catalog of *Cincinnati Sub-Zero Products.*

Sintered Oxides 12

A series of sintered metallic oxides have their physical, chemical and mechanical properties described in bulletin A-7. *Alite Div., U. S. Stoneware Co.*

Loaders 13

Automatic storage-type feed units to provide transfer type or progress through type operations on standard machines are diagrammed in a new catalog. *F. Jos. Lamb Co.*

USE THIS POSTCARD

Rolling Bearings 14

While featuring the new SCM line of ball bearings pillow blocks and flange cartridge mounts, a 52-page bulletin contains up-to-date technical information and list prices on the complete line of SC ball and Dodge-Timken roller bearings. *Dodge Manufacturing Corp.*

Shaped Tubing 15

Shaped tubing is illustrated and described in data memorandum No. 17, just published. Cross sections include squares, rectangles, hexagons, flat ovals, ellipticals, and partial rounds. It gives information on analysis available (stainless, carbon, nickel and nickel alloys, glass sealing alloys, titanium, and beryllium copper), tool charges, size range, commercial tolerances, lengths, temper, and how to order. *Superior Tube Co.*

Tool Steel Data 16

"Tool Steels for the Non-Metallurgist" is written to present a practical understanding of tool steels without being overly technical. It covers the six basic classifications of tool steels, properties, general recommendations, heat treating technique. *Crucible Steel Co. of America.*

Fastening Tools 17

Gulmite hand tools and socket attachments, including 21 different tools for serrated screws, are illustrated in a new brochure. Also listed are the various sizes that fit the different makes of drivers, wrenches and drive adapters. *Bergander Manufacturing Co.*

Instrumentation 18

Services available for the development of instruments for measuring displacements and surface characteristics, including the design, development, building and testing of complete electro-mechanical instrumentation, are explained in bulletin B2 by means of case histories. *Micrometrical Development Corp.*

Air Filters, Oilers 19

In addition to listings of the many sizes and types of air filters and lubricators in production, a new catalog gives figures on the savings made possible by correct air filtration and lubrication at every air drop ahead of air tools. A new Master Hydro-Jector which automatically empties filters and other accumulators of trapped liquids and sludges is shown. A JIC-recommended development, the separable venturi, screw-in lubricator, is also shown. *Master Pneumatic, Inc.*

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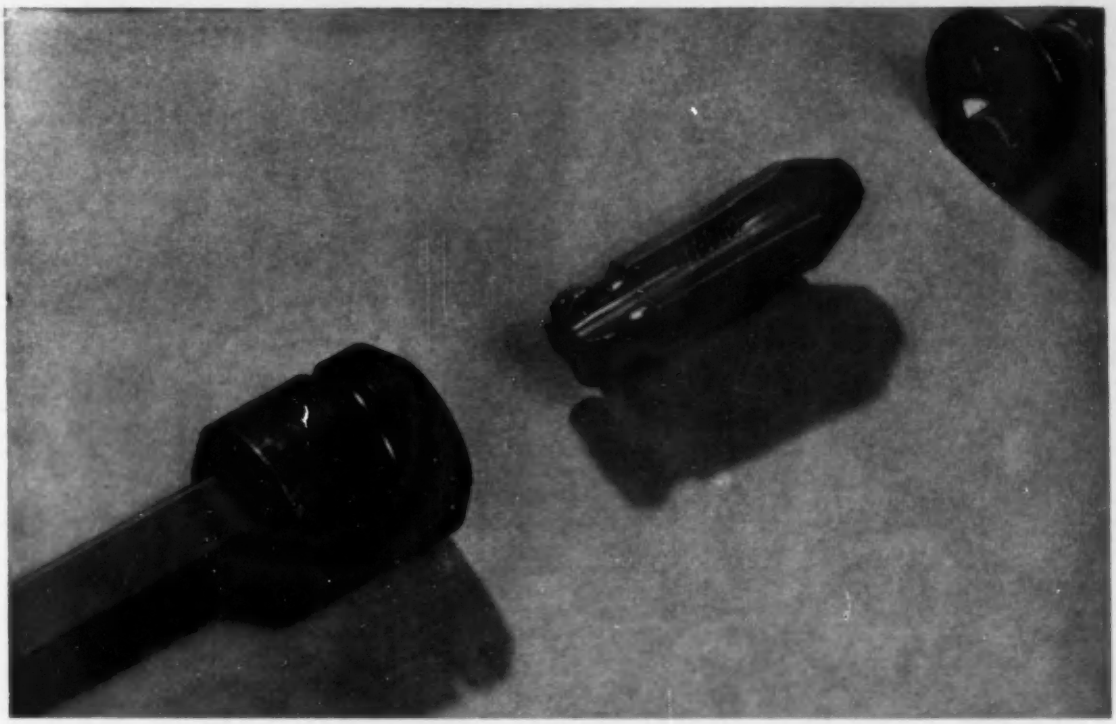


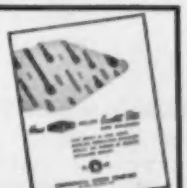
Phillips *"Bits–Holders–Screws"* are Exclusive with Continental!

Here's how they can boost your output

Only the Continental Screw Co. offers this three-way fastening combination to increase your output. Phillips *bits, holders, and screws* now make power-driving really practical—even on your finished parts.

The Continental record speaks for itself. Continental Phillips Bits have driven as many as 1,000,000 screws without replacement. They average from 2 to 4 times longer life than other bits, and have cut fastening costs as much as 50%.

Send for this free booklet on Hy-Pro Phillips Insert Bits and Holders. Write to Continental Screw Co. New Bedford, Mass.



Continental Screw Co.

Manufacturers of Holtite Fastenings

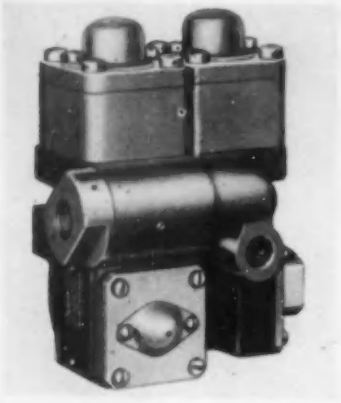
NEW BEDFORD, MASSACHUSETTS, U. S. A.

NEW PRODUCTS AUTOMOTIVE-AVIATION

FOR ADDITIONAL INFORMATION, please use reply card on PAGE 97

Pressure Regulator

An air pressure regulator, model 13200, provides regulated compressor bleed air to external fuel tanks. It conforms to NAS 459 and all ap-



plicable AN and MIL specifications, and meets the requirements of AMC Report MCREXP-524-1854-1. The device operates without overboard bleed, and without external leakage with outlet port plugged and 200 psig applied at the inlet port. It is designed to sustain 11 g applied in any direction. Suitable for use with air, it is not affected by fuels MIL-F-5642, H-3136 or F-5572 in any sequence. Operates on inlet pressure of 15 to 150 psig, with up to seven cfm maximum flow of standard air. Proof pressure is 200 psig. *Aro Equipment Corp.*

Circle 20 on postcard for more data

Cushions Lift Trucks

Shock and vibration in hydraulically operated lift trucks can be reduced with a new hydraulic accumulator. The bulb-like device is connected in the main pressure line between the lift cylinder and the control valve. Inside a steel shell is a flexible rubber bag which is precharged with air or nitrogen to match the working pressure and loads handled. The hydraulic system pump forces oil into the shell and the gas bag compresses to balance line pressure. Any sudden impact at the fork is absorbed by further compression of the gas bag. *Greer Hydraulics, Inc.*

Circle 21 on postcard for more data

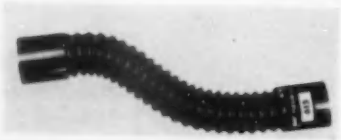
Checks Aircraft Plugs

An aircraft spark plug reconditioning unit can be used for 10 separate servicing operations: Wire-brush-cleaning the lower and upper spark plug threads, sand-blast cleaning the lower portion of the insulator, scour-cleaning the upper portion of the insulator, washing and drying, setting the electrode gap, testing for gas leakage, electric testing the insulator, testing the resistance of the center wire, visual inspection of spark plugs, and greasing of threads. *AC Spark Plug Div., GMC.*

Circle 22 on postcard for more data

Flexible Hose

Machine-molded flexible radiator hose, an advanced version of the hose introduced in 1951, features all-neoprene construction for resistance to heat, abrasion, soluble oils, radiator additives and cooling system chemicals, as well as its ability to provide maximum protection against sharp

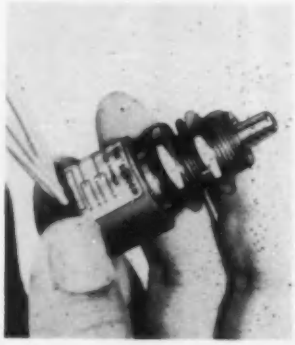


metal parts. DuPont Hypalon coating is applied inside and out to protect against aging and weather-checking. Integrally molded tempered steel springs are another feature. Machine building is said to insure length tolerance within ⅛ in. of size. *W. J. Voit Rubber Corp.*

Circle 23 on postcard for more data

Sealed Switch

A sealed switch one in. in diameter and two in. high has been designed for use on exposed aircraft applications. The 1EN1-6 switch has two



single-pole, double-throw switching units. The housing is evacuated and filled with inert gas under pressure to insure constant operating characteristics regardless of atmospheric change. The unit also features an ice scraper at the base of the actuator to remove mud or ice which might collect on the plunger. The switch is designed for bracket type or through-hole mounting. *Micro Switch Div., Minneapolis-Honeywell Regulator Co.*

Circle 24 on postcard for more data

Magnesium Primer

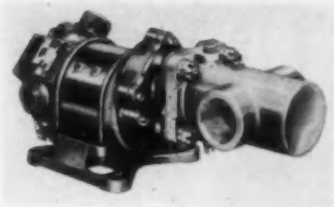
A primer for magnesium, designated as 40X-675, can be sprayed or dipped and has fast-drying characteristics. Designed to check electrolytic decomposition in assemblies where magnesium is joined to less active metal, the new primer also resists the solvent action of hydraulic fluids in aircraft. It can be applied directly either to untreated or to chemically treated magnesium.

A film thickness of 1½ mils provides long lasting salt spray resistance. *Stanley Chemical Co.*

Circle 25 on postcard for more data

Special Pump

An electric-motor driven lubricant pump for a helicopter transmission clutch, model RG-6100E-1, pumps five gal in 20 seconds with oil at 70 F.



This is a special intermittent duty requirement to assure proper function of the clutch during motor start. The pump is rated at 15 gpm continuous duty when oil temperature is above 160 F.

The pump is a self-priming, rotary, four-blade, positive displacement nonpulsating type. Sliding blades are self-compensating for wear on the pump bore and automatically free from variation in performance at extreme temperatures. Bore of the pump is developed with multiple radii to cause intermittent sliding of blades in rotor slots. This mechanical action prevents blades from sliding when under load. Rated capacity is 900 to 1000 gal per hour at 10 psi and 2500 rpm. No lubrication is required with pump operating on hydraulic oil.

The shaft seal which engages the spline drive coupling provides flexibility to seal against leakage. A stationary seal disk and revolving seal plate are mounted on synthetic rubber O-rings. No leakage of the shaft seal is present at the lowest drain port. *Lear, Inc., Lear-Romec Div.*

Circle 26 on postcard for more data

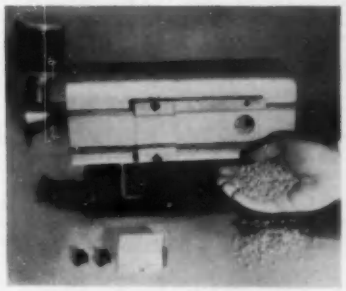
Seat Covering

A new water-repellent upholstery material, basically composed of microscopic inter-connecting cells, has been announced. Air-Porous Koroseal has more than 50,000 inter-connecting cells to the square inch. For cooler seating in warm weather, the porous, air-filled cellular structure of the new material permits evaporation of perspiration. By allowing moisture vapor and air to permeate its surface the new material permits the human skin to function efficiently as a cooling system for the body. The material feels warmer to the touch in cold weather than regular vinyl material because the cellular structure acts as an insulator and transfers heat slowly from the body. No holes of any kind are punched in the material which has a soft, washable, scuff-resistant plastic surface. *Industrial Products Div., B. F. Goodrich Co.*

Circle 27 on postcard for more data

Catalyst Muffler

Leaded gasoline now can be used with a new catalytic muffler for industrial plant vehicles. The Oxy-Muffler reportedly eliminates by catalytic burning as much as 90 per cent of the carbon monoxide, and most of the aldehyde and hydrocarbon fumes from industrial truck exhausts. Difficulties encountered from lead poisoning of the catalyst in earlier experiments have been overcome, reports the company. Designed for direct connection to the engine exhaust manifold, the muffler can be quickly installed on any standard industrial vehicle without major engine or carburetor changes or adjustments. From a cold start, the muffler provides full rated clean-up after operation of the engine under load or at high speed idling for three to five minutes. Life

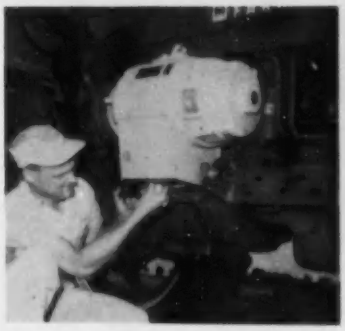


is expected to be at least 600 operating hours—the equivalent of about five months' fork lift truck performance in many plant operations. When efficiency drops below the level desired by the plant operator, the catalyst pellets can quickly be removed and replaced with fresh ones. A pyrometer indicator connected to a thermocouple in the muffler gives the operator a continuous panelboard indication of catalyst efficiency and engine performance. *Oxy-Catalyst, Inc.*

Circle 23 on postcard for more data

AC Power

An a-c auxiliary power system specifically designed for International Harvester farm tractors is now in production. The 10-kw generator is



a 208-v, three-phase 60-cycle revolving field alternator. It has a static type voltage regulator, overload protection, distribution system and exciter integrally mounted.

The system is designed to operate trailing machine motors, provide transportable power or emergency power. It has output connections for 120-v and 208-v, single and three phase power. *General Electric Co.*

Circle 29 on postcard for more data

Diesel Starter

A hydraulic starting system for Diesel engines was announced recently. Called the Hydrostarter, the starting system consists of a hydraulic motor, a piston type accumulator, an engine driven pump, a reservoir and a manual pump. No outside source of energy is needed. After the accumulator has been loaded and sealed with an inert gas, an engine-driven pump maintains pressure and the manual pump permits emergency recharging. The system was engineered to operate in remote installations where cold weather and frequent periods of equipment inactivity can be detrimental to conventional electrical starting equipment. The starter delivers a static torque of 80 ft lb at 3000 psi working pressure.

The motor extends slightly more than nine in. from the engine flywheel housing and can be installed by the average mechanic. It can be coupled to practically all Diesel engines up to 300 hp in the same way as a conventional electric starter. *Allison Div., GMC.*

Circle 54 on postcard for more data

The new refractoform grinder

VERSATILE MACHINE

for

High-Speed Optical Grinding

Developed

by Aircraft Builder

ENGINEERS at Northrop Aircraft, Inc., of Hawthorne, Calif., have developed a new type of high speed optical grinding machine, called a "refractoform" grinder, for the precision grinding of any spherical, aspherical, rhomboid, polyhedron, prismatic or other form which can be used to refract light.

The base of the machine was cast of high tensile nickel alloy iron and the ways were machined and scraped to within three seconds of arc variation in the full travel of the carriage while mounted on strain gages.

A separate unit contains a 30 hp electric motor which drives a high pressure hydraulic pump (2000 psi) and a low pressure (200 to 500 psi) pumping unit.

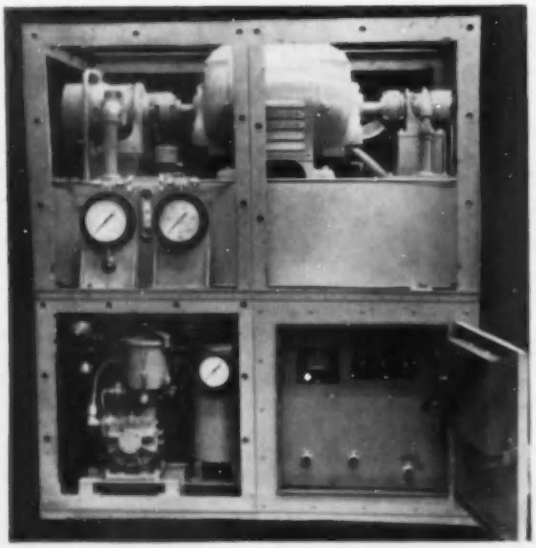
Vertical travel of the tool carriage and feed of the machine are motivated by the low pressure system, and the high pressure system powers the tool and work table.

It grinds quartz, glass, or metal to extremely precise optical tolerances. The operator has infinite control of dimensions which enables the machine to carry through more nearly to the polishing stage than standard equipment. Finish polishing could be accomplished but it is more economical to perform the final operation on ordinary optical machines.

However, polishing masters—cast iron forms accurately ground to the desired curvature of spheroids or other forms to be lapped—may be accurately and quickly generated on this machine.

A feature is a vacuum chuck consisting of a polished perforated plate and a flanged neoprene rubber gasket which grips the base of the work piece tightly when the vacuum is applied. The perforated plates vary in size to hold any part up to 40 in. in diameter and special gaskets fit each size. The vacuum system is housed in the separate unit with the high and low pressure pumps and generates 12 psi to hold the work.

The machine was built at Keystone Engineering Co., Los Angeles, to Northrop specifications and design, and the Keystone company has been licensed by Northrop to manufacture the machine.



The power unit which supplies hydraulic pressure to the new Northrop Aircraft, Inc., refractoform grinder. A 30 hp electric motor drives a high pressure pump (upper left) and a low pressure unit (upper right). The unit at lower left supplies a 12 psi vacuum for the new machine's vacuum chuck.

SCHWITZER

TURBOCHARGERS

OVER ONE HUNDRED MILLION MILES OF PROVEN COMMERCIAL OPERATION

With 30 Years of Extensive Research and Production Experience in the Supercharging Field, Schwitzer Now Offers a Complete Line of 4 Sizes of Turbochargers For 50 to 1200 HP Installations. Now in Production in All Heavy Duty Fields—Truck-Tractor-Stationary-Marine.

SCHWITZER
CUMMINS COMPANY
INDIANAPOLIS, INDIANA

News of the AUTOMOTIVE AND AVIATION INDUSTRIES

Continued from Page 39

9.2 Million Vehicles Forecast For 1955

Estimates of 1955 production and sales of new cars continue to be revised sharply upward. A new look at output schedules for the fourth quarter now indicates a total of at least eight million new cars and 1.2 million trucks this year.

This would be a grand total of 9.2 million units, 1.2 million above 1950, the previous best year. Most optimistic forecasts made for automobile sales early this year now look conservative.

Next year is expected to be another big year for the automobile industry. Highest estimate made so far is for production of about the same number of cars as this year—approximately eight million. Several automobile producers — including Ford, Mercury, Cadillac and Lincoln—have indicated they will increase annual output capacity considerably.

Device On Instrument Panel Locks Rear Doors on Vehicle

In view of the current interest in automotive safety devices, an interesting possibility is an electrically activated system for locking the rear doors. Operation is controlled by the driver through a button on the instrument panel.

One of the automobile companies is looking at such a device as a possible optional item. Early reports indicate, however, that some engineering still remains to be done.

Record Year Sighted For Tire Producers

The tire industry will break all sales and production records this year, predicts J. Chester Ray, administrative head of the Tire Div. of U. S. Rubber Co. He said the industry will produce about 95 million passenger car tires and 14.5 million truck tires.

Although truck tire output will not set a new record, it will be, nonetheless, about 16 per cent above last year. By comparison, car tire output will be nearly 20 per cent above the previous record of 81 million tires made in 1953.

Mr. Ray said tire production next year, which is also expected to continue at a record pace, will be influenced basically by the tremendous demand from automobile manufacturers. The extremely high replacement demand resulting from a record number of vehicles on the nation's highways will also have a marked effect. About 55 per cent of all tires produced this year will be for replacement and export needs. The remaining 45 per cent will go to car makers for original equipment.

Pointing up the continuing popularity of tubeless tires, Ray estimated that such casings will constitute about 30 per cent of the replacement market this year. The figure was less than two per cent prior to 1954.

U. S. Rubber plans to spend more than $30 million for tire research, modernization, and expansion in 1956. The company has been modernizing plants and improving production methods constantly and expects to achieve its best year for sales and production in 1955.

FIAT SEDAN FEATURES MORE POWERFUL ENGINE

The new Fiat 1900 A sedan, is an improved version of the previous 1900 model. The new model has a four-cylinder engine with an output of 70 bhp at 4000 rpm.

Highway Safety Center Proposed in Michigan

Plans are afoot to set up the country's first highway traffic administration center covering the entire field of safety. To be located at Michigan State University, the center would conduct short courses, conferences, and special institutions for persons engaged in all phases of safety work.

Car companies are being asked for funds to get the program going. A special legislature session also will be urged to help support the project. The automobile industry has indicated it would help finance the program, if the state is willing to make additional funds available.

Chrysler Plans To Build 22 Training Centers

Chrysler is planning eventually to build 22 automotive service training centers throughout the country, one in each region. The first and largest center, providing 75,000 sq ft of floor space, now is under construction adjacent to the Mopar headquarters north of Detroit and will be used as a model for the others.

(*Turn to page* 188, *please*)

A Mechanical Eye...

Ford Cuts Tool Costs with Cross Machine Control Units

One of the Cross Machine Control Units at Ford Motor Company's Cleveland Engine Plant

(U. S. Patent Nos. 2679038 and II-163935. Others pending).

According to records, 221 Cross Machine Control Units in operation at Ford Motor Company Plants are assisting them greatly in improving tool trouble conditions.

One reason for this is that the Machine Control Unit provides a definite and convenient place for storing tools . . . tools which are pre-set so they can be placed in operation immediately without making machine adjustments.

Another reason is that the Cross Toolometer, an integral part of the Machine Control Unit, provides a standard for the performance of the tools, thereby enabling corrective action to be taken when necessary. The Toolometer dial is set to indicate the number of pieces which a given tool should produce. When the dial has reached that pre-determined figure, the machine automatically shuts down and the tools are changed. At the same time, other tools indicated by the Toolometer as approaching the end of their usefulness are also changed to take full advantage of the machine shut down.

The Cross Machine Control Unit is helping to keep Ford production going and is also assisting greatly in controlling tool life.

Established 1898

THE CROSS CO.

DETROIT 7, MICHIGAN

Special MACHINE TOOLS

The BUSINESS PULSE

Business Operations Expected To Continue at High Rate During Remainder of this Year. Steel Orders Are Reported To Be Running in Excess of Output, and Mills Are Pushing Toward Capacity To Catch Up with Backlogs

This Survey Is Prepared Exclusively for AUTOMOTIVE INDUSTRIES by the Guaranty Trust Company of New York.

Complicated Business Outlook

The President's illness has greatly complicated the economic outlook. The pronounced initial decline in share prices quite obviously was occasioned by concern on the part of investors that business confidence might become impaired.

It is too early to judge whether significant weakening of business confidence is actually likely. The stock market, it is well to remember, had been rendered technically vulnerable to unfavorable news because of the sharp previous rise in security prices. It is conceivable, therefore, that the setback experienced in the market exaggerated the probable impact on general business confidence. From an analytical standpoint, it would be premature at this point to make assumptions to the contrary, especially since a number of prominent business leaders have made public statements to the effect that their business plans remain unchanged. There seems a good possibility, moreover, that whatever unsettling effect there may have been on confidence will be minimized if the President continues to make satisfactory progress in recovery. This is suggested by the fact that the tone in financial markets improved considerably after medical specialists announced that the President's chance of complete recovery was "reasonably good."

Actual business operations certainly give every appearance of continuing at peak levels. This is hardly surprising, for it is now abundantly clear that there was no loss of momentum whatsoever during the recent summer period. Indeed, there definitely appears to have been a further acceleration in the pace of business during July-August above the high rate achieved last spring. At this writing, the official estimate on the rate of gross national product for the third quarter has not been released, but it will be surprising if the figure, when published, is not at least several billion dollars above the $385-billion rate reported in the second quarter.

This momentum, together with evidence that certain important areas of the economy are still expanding, makes a continued large volume of operations probable for the remainder of this year. Indeed, there seems a better than even chance for some further growth.

For one thing, the automobile industry—though it has been in a lull in recent weeks on account of models changeovers—will very shortly begin to develop a full head of steam again. In November and December, automobiles will in all likelihood be produced in record volume, as manufacturers strive to capture as much of the market as possible in the early part of the model year.

All-Out Production Schedules

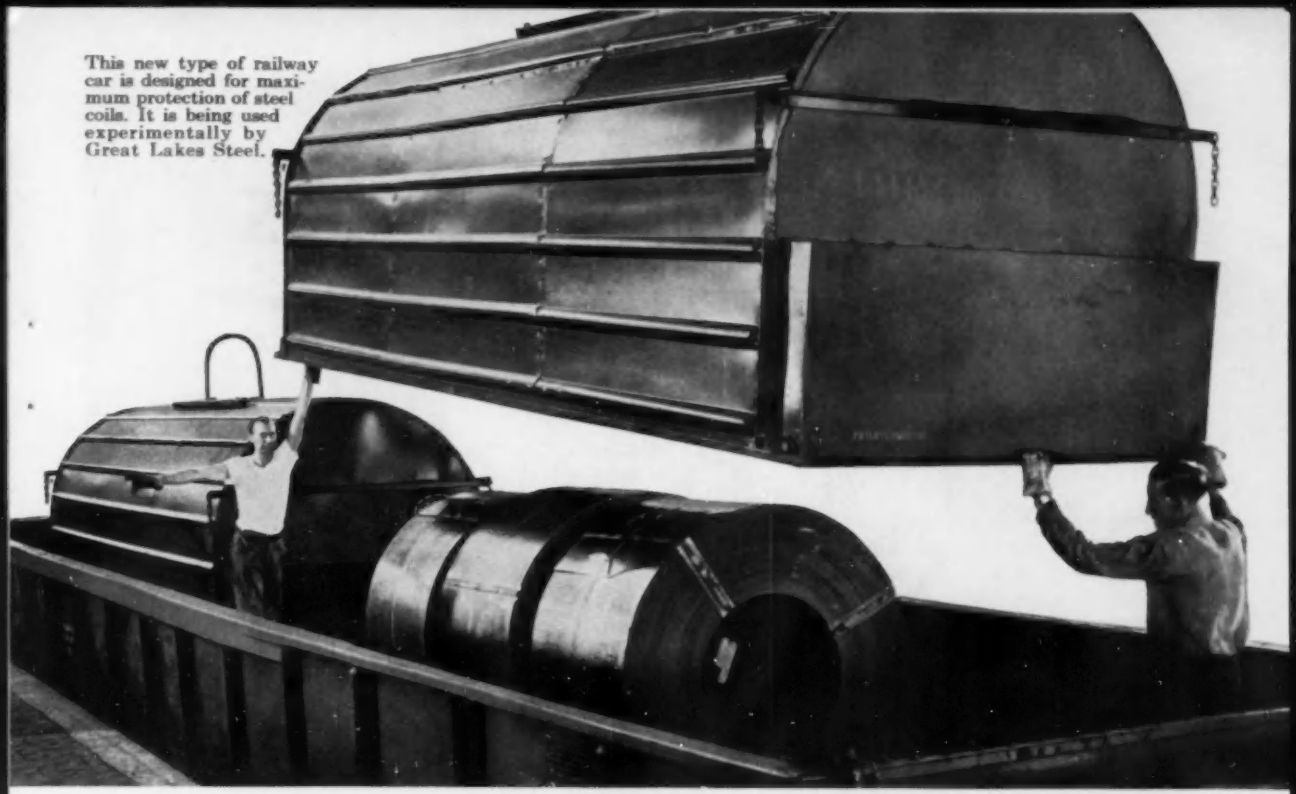
This prospect of all-out production schedules at the end of the year does not seem to be contingent in any important degree on sales experience in the next several months. Even if this year's "cleanup" should be something less than satisfactory, and even if sales of new models in coming weeks should fall below expectations, these setbacks would probably have little effect upon near-term output, inasmuch as some accumulation of stocks in dealers' hands is a natural occurrence in the early phase of any model year. Thus, manufacturers would very likely tolerate a fairly substantial buildup of new-car inventories in the final phase of this year, delaying output cutbacks until it became unmistakably clear that market sluggishness was not a passing phenomenon. There is little prospect that this will happen, if it happens at all, until well after the beginning of 1956.

Developments in the steel industry also have bullish implications for the remainder of this year. Orders are still reported to be running in excess of output, and mills are pushing operations toward capacity in an effort to catch up with backlogs. Prospects are that many marginal facilities will have to be activated before the end of the year.

No Excessive Inventory

The inventory situation also is a positive factor in the outlook, because, although there has been considerable accumulation of stocks this year, no significant indications of excessive holdings have yet appeared. Some of the traditional yardsticks suggest, in fact, that the rise in inventories has not kept fully abreast of the rise in sales and orders, particularly at the

(*Turn to page* 184, *please*)

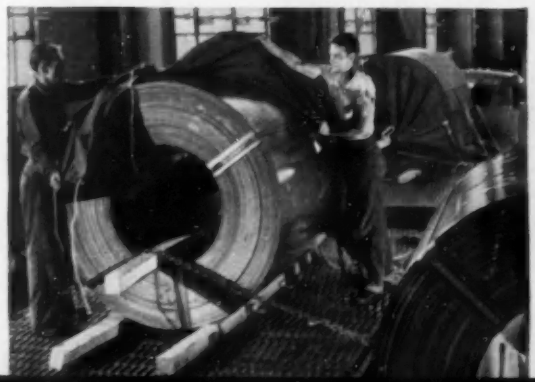


This new type of railway car is designed for maximum protection of steel coils. It is being used experimentally by Great Lakes Steel.

How Great Lakes Steel *delivers* quality

Another order receives individual attention as sheets of steel are wrapped with a waterproof covering and banded to meet the customer's specifications.

Steel coils (below) are securely blocked on a truck and trailer at Great Lakes Steel. Heavy tarpaulin cover is provided by truckers as standard equipment for additional protection.



The emphasis on quality at every stage of production at Great Lakes Steel extends right on through to the Delivery Department. There, careful attention is given to handling and packaging each coil and bundle to make sure that the customer receives his order in prime condition.

The Delivery Department has another important responsibility, too. It must see that our products reach each customer in ample time to meet his production schedules.

For quality with service—that extends all the way from the beginning of our operations to the end of yours—call on Great Lakes for your flat-rolled steel requirements.

GREAT LAKES STEEL CORPORATION

Ecorse, Detroit 29, Michigan • A Unit of

NATIONAL STEEL CORPORATION

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AIRBRIEFS

By RALPH H. McCLARREN

Business Flying

"Today a vast new civil airfleet is at work in our land, flying the skylanes day-by-day in behalf of American business and industry. These airplanes—21,500 strong—are indispensable 'tools' for modern successful competitive enterprise." These are the words of Gill Robb Wilson, president of the Air Force Association, who was principal speaker before the eighth annual banquet and honors night dinner of the National Business Aircraft Association held in Detroit, October 7th. During the three day convention devoted to various aspects of business flying, speakers included Charles F. Kettering, who predicted an expanded use of aircraft by business to meet requirement of planned decentralization of plant functions.

Frederick B. Lee, Federal Civil Aeronautics Administrator spoke of the work of his organization to meet the challenge of aviation's rapid expansion. Dr. John B. Furbay of TWA, who directs a global air education program, urged that travelers develop a genuine appreciation of other peoples, their history, philosophy, and contributions to world culture in order to better understand and visit with our so-close-by-air neighbors.

Annual Safety Awards were presented to 69 NBAA member organizations who have flown their aircraft 500,000 miles or more without accident involving damage to property or person. Fifteen of these are "million milers."

Steam Catapults for Aircraft Carriers

A unique feature of the recent and spectacular National Aircraft Show held at Philadelphia's International Airport last month was the launching of jet aircraft from the deck of the U.S.S. Ticonderoga. The huge 888 ft long carrier was docked at the Gulf Pier in the Delaware River adjacent to the Airport in view of spectators. Each day during the Aircraft Show jet airplanes were launched as part of the program. According to the announcer, "for the first time from a vessel when docked to a pier." The steam catapults were installed during reconversion work which began in 1952 at the New York Navy Shipyard. They enable the Ticonderoga to handle the Navy's largest and fastest jet aircraft. After each launching one could see the escaping steam along the length of the catapult located forward on the flight deck.

New Autopilots Used on Record Jet Hop

Republic F-84F fighters which flew 5118 miles nonstop recently from London, England, to Dallas, Texas, were equipped with an advanced-type automatic piloting system developed by Lear, Inc. The new autopilot, designated type MB-2 by the Air Force, was credited as an important factor in the success of the mission by Colonel Richard N. Ellis, commanding officer of the 27th Strategic Fighter Wing which made the record distance flight.

Colonel Ellis disclosed that his jet fighter was flown on autopilot during the entire 10 hour and 58 minute flight except during aerial refueling hook-ups with the KB-29 tanker planes. Singled out by Colonel Ellis as outstanding features of the Lear system were simplicity of operation as compared with other autopilots he had flown, and extreme precision of the automatic altitude control at very high altitudes and speeds.

Joint Meeting: American and Canadian Engineers

In Ottawa, Canada, on November 3rd and 4th the second annual meeting of the Institute of the Aeronautical Sciences and the Canadian Aeronautical Institute will be held. Some 400 engineers and aviation industry executives are expected to attend.

Sessions will be devoted to Aircraft Structures, Materials and Processes, and Aircraft Safety Design and Accidents. A visit is scheduled to the National Aeronautical Establishment in Ottawa. These laboratories are devoted to research in structures, high speed aerodynamics, gas dynamics and engines.

$4¾ Billion Paid to Sub-Contractors and Suppliers

Of an $8,744,270,000 chunk of the aircraft program in 1954, $4,759,320,000 was paid by the aircraft industry for services and products received from sub-contractors and suppliers; 54 per cent of disbursements,

(*Turn to page* 132, *please*)

3 ELEMENT
SPEED SENSITIVE SWITCHES

STANDARD GOVERNOR FLY-WEIGHT PRINCIPLE

SNAP-ACTION SWITCHES

SPLASH PROOF

FLEXIBLE DRIVE SHAFT TO COMPENSATE FOR MISALIGNMENT

MODEL GA-3

NO BRUSHES OR COLLECTOR RINGS

SEALED BALL BEARINGS

ADJUSTABLE WHILE RUNNING

HIGH REPEATABLE ACCURACY

Synchro-Start Model GA-3 is a three element governor having a housing suitable for direct mounting on an AND 20005 engine tachometer pad. It contains three snap-action switches that may be independently adjusted to open and close circuits at any speed between 1,200 to 10,000 RPM. Particularly adaptable to the more elaborate engine and turbine control systems.

DIMENSIONS—Diameter 2⅝"—Length 6"—Weight 1¾ lbs.

Other models of Synchro-Start governors are available with 1, 2, and 3 switches together with a variation of mountings.

Further information upon request.

Synchro-Start Products Inc.

8151 N. RIDGEWAY AVE.
SKOKIE, ILLINOIS

1956 Chryslers

(*Continued from page 53*)

more efficient center-plane brakes.

There are two new V-8 engines—a more powerful 280-hp FirePower V-8 in the Chrysler New Yorker line and a 225-hp Spitfire V-8 in the Chrysler Windsor line. A high-efficiency power modification available on Windsors boosts Spitfire engines to 250 hp.

Taking advantage of today's higher-quality gasolines, Chrysler has increased the compression ratio of its Spitfire engine in the Chrysler Windsor line from 8.0 to 8.5 to 1, increased its bore diameter to 3.81 in., and increased its displacement to 331 cu in. for 225-hp at 4400 rpm. With the new super power modification offered as optional equipment, the Spitfire delivers 250 hp at 4600 rpm.

The FirePower engine in the Chrysler New Yorker line has a new compression ratio of 9.0 to 1, a bore diameter of 3.94 in., and an increased displacement of 354 cu in. for 280 hp at 4600 rpm. The stroke of both engines is 3.63 in.

Tail lights, stop lights and back-up lights have been designed into a a single integrated unit, fully protected at the top by a "brow" which juts out from the fender. Large wheel openings and distinctive wheel covers emphasize the functional quality of the wheels. New easy-pull door handles have been designed to actuate the LifeGuard door latches.

Standard equipment for 1956 are new floating-shoe center-plane brakes. Pedal-effort required for the new brakes is said to be 25 per cent less than for conventional brakes.

A new vacuum-operated Power-Smooth power brake is also offered in conjunction with the center-plane brake for 1956. It provides a mechanical advantage of 2.5. It is standard on Chrysler New Yorker models and optional on Chrysler Windsor models.

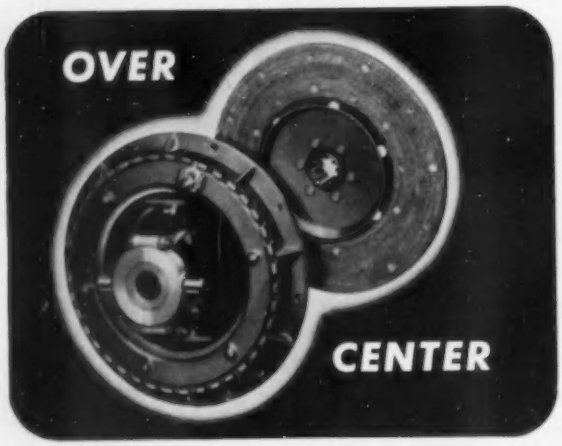
A new aircraft-type gasoline heater is offered as optional equipment on 1956 Chrysler lines. Using a separate fuel pump and ignition system, the new heater delivers air at 100 F within 15 seconds of being turned on. It can melt ice from windshields with a blast of 200 F heat in a very short time.

Also available on Chrysler cars in 1956 are: full-time PowerPilot steering, Air-Temp air conditioning, four-way power seat control, electrically-operated window lifts, electro-touch tuning radio, rear speaker, Solex glass, and other accessories.

A unique self-regulating electric-mechanical clock, which automatically compensates itself for error each time it is set, is standard equipment on the Chrysler New Yorker and is offered as an option on the Chrysler Windsor.

In common with other 1956 Chrysler Corp. cars, Chrysler has a new push-button controlled drive. The push buttons are mounted on a panel projecting from the instrument panel. A hydraulic inter-lock prevents the driver from accidentally selecting reverse when he is traveling over 10 mph. The button in operation is dimly lighted at night, with the buttons not in operation brightly lighted for easy range selection.

ROCKFORD



LARGE DRIVING AREA

EASY OPERATION
HIGH TORQUE
POSITIVE ENGAGEMENT
LARGE DRIVING AREA
SMOOTH RUNNING
INFREQUENT ADJUSTMENT
MINIMUM INERTIA

* The pressure plates in ROCKFORD Over-Center CLUTCHES have large area, accurately flat-ground surfaces for maximum contact with the facing material. Special alloy iron is used to withstand shock and heat strains. Provision is made for multiple driving, from the back plate. Have hardened steel bearing inserts, where the roller cams operate.

Send for This Handy Bulletin

Shows typical installations of ROCKFORD CLUTCHES and POWER TAKE-OFFS. Contains diagrams of unique applications. Furnishes capacity tables, dimensions and complete specifications.

B-W BORG-WARNER

ROCKFORD CLUTCH DIVISION
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CLUTCHES

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Straight facts about centrifugal castings!

Get this new booklet, "One Source," that tells the story of centrifugal casting manufacture! Read how creative engineering and advanced metallurgy at Campbell, Wyant and Cannon assures a more uniform, denser structure for electric furnace alloys resulting in longer-wearing, easier-to-machine castings. In addition to information on centrifugal castings, it contains interesting data on all of the subjects listed below. Send for your free copy now!

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- Steel Castings
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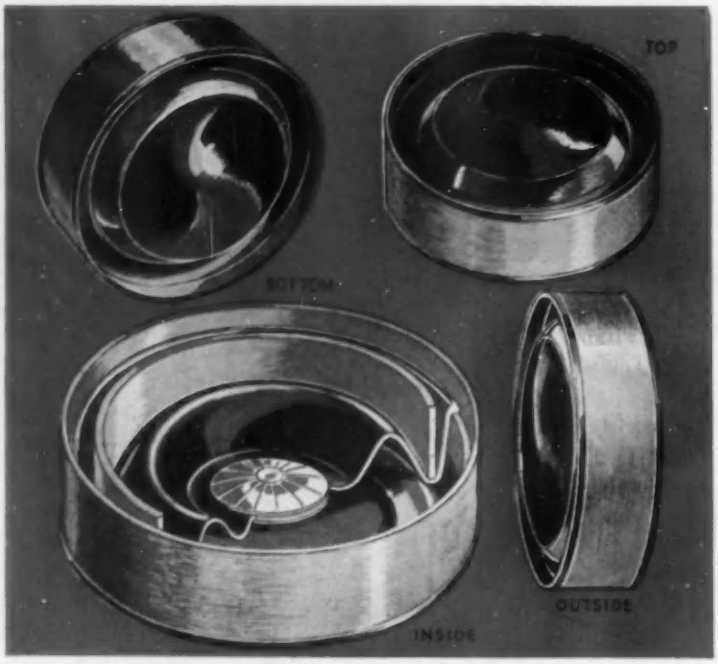
- Castings in Limited Quantities
- Castings in Volume



viewed from any angle . . .

This HEAVY DUTY UNIT PACK

CLEVELAND CONTAINER

has definite advantages in both military and domestic uses.

As shown here, the product packaged is a 10" diameter synthetic rubber diaphragm or bladder used in aircraft hydraulic accumulators. The pack is designed to eliminate distortion.

Vickers Incorporated, leader in hydraulic products, has found that with the use of this type of Cleveland Container a labor saving was effected of 85% and packaging production increased more than 400%.

Consult our nearest plant for similar advantages in using Heavy Duty Unit Pack Containers.

Why pay more? For Good Quality . . . call CLEVELAND!

THE **CLEVELAND CONTAINER COMPANY**

6201 BARBERTON AVE., CLEVELAND 2, OHIO

PLANTS AND SALES OFFICES: CLEVELAND, DETROIT, CHICAGO, MEMPHIS, LOS ANGELES, PLYMOUTH, WIS., JAMESBURG, N. J., OGDENSBURG, N. Y. • ABRASIVE DIVISION CLEVELAND

SALES OFFICES: NEW YORK CITY, WASHINGTON, D. C., ROCHESTER, N. Y., WEST HARTFORD, CONN.

• ALL-FIBRE CANS • COMBINATION METAL AND PAPER CANS • SPIRALLY WOUND TUBES AND CORES FOR ALL PURPOSES

CLEVELAND CONTAINER CANADA, LTD.
Plants & Sales Offices: TORONTO AND PRESCOTT, ONT. Sales Office: MONTREAL

Fast Tank Setup

(*Continued from page* 65)

edges are flush with the ends of the cylinder. Then, the workpiece is transferred to the lower or welding position where the two seam welding wheels bear, one close to each end. Welding is done automatically at both ends as the work is rotated under the wheels. As the welding cycle is automatic, one man operates this welder and that which makes the longitudinal weld, loading them alternately.

After completion of the welding, each tank is passed to the test setup, Fig. 5, that includes a fixture holding three tanks, each of which is connected to an air line that applies 22 psi pressure to all three units, after which the fixture that clamps the tanks is lowered and carries the tanks under water so that any leaks are quickly detected. If any leaks are found they are marked, soldered and retested, but the percentage of leakers is small. Operation of the dunking machine is automatic save for loading and unloading the tanks and checking for leaks.

Except for making repairs to leakers, the whole setup is operated by two men plus half the time of one man who applies tubes to caps and operates the soldering machine, yet 154 tanks an hour are completed, which is a high rate, considering the number of operations required.

Stock used for tank shells and ends is terne plate 0.0255 in. thick but is welded readily as long as the lead coating does not exceed 0.005 in. in thickness. Soldering is readily done on this stock and its corrosion resistance is good.

Metal Show Preview

(*Continued from page* 74)

The fourth session on chromium will be on "High-Chromium Alloys." "Toughness and Mechanical Properties of Chromium-Iron Alloys" will be reported on, as will "A Forgeable Chromium-Iron Based Alloy" and "Metallography of Chromium and Chromium-Rich Alloys."

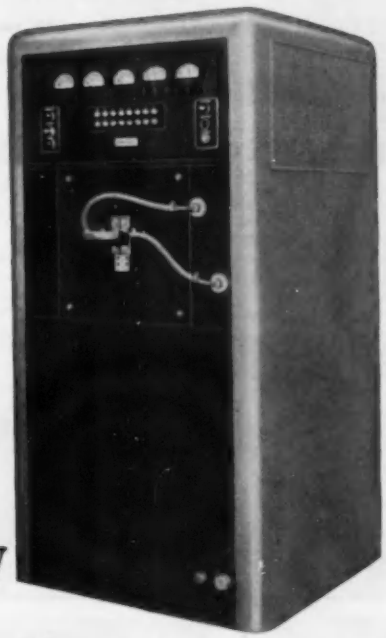
A one-day conference on Powder Metallurgy in Atomic Energy will be held on Thursday, October 20th. Morning sessions will cover the general metallurgical problems involved in the design of nuclear power reactors. The afternoon session of the conference will cover specific metals and alloys and their uses as powder for nuclear reactor purposes.

To help improve induction heating applications, Lindberg engineers have spent two years developing equipment for M-G set frequencies of 1 kc., 3 kc. and 10 kc. This equipment is now available to you.

This development has also produced many advanced design features that are incorporated in control and heating stations used in connection with motor generator equipment.

Generators are available in power outputs from 30 kw. to 1250 kw.

Lindberg engineers are now equipped to solve your metal heating problems using optimum frequencies for specific applications from 60 cycles upwards. For information consult your nearest Lindberg field office or write for Bulletin No. 1460.



The High Frequency Division of Lindberg Engineering Company announces a complete line of MOTOR GENERATOR EQUIPMENT for all Induction Heating Applications

HIGH FREQUENCY DIVISION
Lindberg Engineering Company
2491 W. Hubbard St., Chicago 12, Illinois

New, Longer Imperial Has 280-Hp Engine

(*Continued from page 52*)

forward along the full length of the car.

The Imperial and Crown Imperial's hemispherical - combustion - chamber FirePower V-8 engine has greater power and torque for 1956. Compression ratio has been raised to 9.0 to 1. Displacement has been increased to 354 cu in. by enlarging the bore to 3.94 in. for 280 hp at 4600 rpm. Stroke is 3.63 in. New charge cooled spark plugs are used.

In order to provide a full-sized, fully-opening rear door window, it is made in two sections. As the regulator is operated, the rear section folds forward just inside the larger forward section, which moves straight down. Both sections are operated by a single regulator.

Offered as optional equipment is a new aircraft - type gasoline heater which uses a separate fuel pump and ignition system. It provides air at 100 deg within 15 sec after turning it on. The conventional-type heater is also available.

A new door latch features interlocking pieces of heavy-gage steel which bind the doors and body together. The danger of doors flying open upon impact is said to be virtually eliminated by the new latch.

A new 12-volt electrical system will be used on the 1956 cars.

In addition to new windshield wipers which clean 10 per cent more window area than last year's models, Imperial features a new modified Hotchkiss drive, improved sealed-beam headlights, and on the Crown Imperial, a new search-tuning transistor radio which is claimed to use only 10 per cent as much battery current as conventional tube sets.

Completely new in design, a high-performance vacuum-operated power brake is standard equipment for 1956. The new power brake operates in conjunction with the all-new center-plane brake unit. The power brakes reduce pedal effort by 25 per cent.

An exclusive Chrysler Corp. feature available on 1956 Imperial cars is the record player which provides up to 45 minutes of uninterrupted music from each side of special seven-inch records.

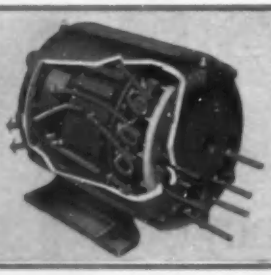
The record player has been especially developed for Chrysler by Columbia Broadcasting System Laboratories. The player was built by CBS-Columbia, the service manufacturing division of CBS. The records, of which six are furnished with each installation, are pressed especially for Chrysler by Columbia Records. A special group of 35 new records is available for use with the device.

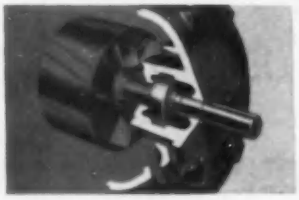
To AUTOMOTIVE ENGINEERS, Howell suggests

What to look for in the new Rerated Open Motors

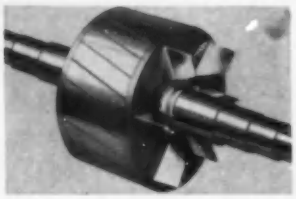
Besides the compactness, lighter weight to handle and ship, and the lower cost in many h.p. ratings that the rerated motors give you, why not look for evidences of *all-around* modernization in motor design? New ventilation principles, real streamlining, and better bearing protection, for instance. Compare the Howell Series 100 motors — a few details on the open drip-proof construction are shown below — and you'll *have* what you're looking for!

VENTILATION . . . "Cool running" means long life in motors. The steel shell of a Howell motor and a new stator design with the largest air passages yet devised put ample ventilation where it's needed. Compare!





BEARINGS . . . They should be fully protected. Dirt can't enter Howell's double shielded bearings either from inside or outside the motor, because they are sealed in the end plate cavities by dust-tight inner caps. Compare!



COPPER-CLAD ROTORS. . . Howell motors have copper-clad rotors. This means better heat conductivity, stability at high temperatures and, as opposed to die-cast rotors, greater design flexibility to meet your special requirements. Compare!

In addition to the open drip type shown here, Howell Series 100 motors are made in splash-proof, weather-protected and TEFC enclosures; also as the power units of Howell generators and brake motors.

WRITE FOR BULLETIN B-100-B

HOWELL MOTORS

HOWELL ELECTRIC MOTORS COMPANY, HOWELL, MICH.
Precision-Built Motors for Industry Since 1915

HOWELL Reel Power MOTORS

BOOKS . . .

LAPLACE TRANSFORMS FOR ELECTRICAL ENGINEERS, *by R. J. Starkey, published by Philosophical Library, 15 E. 40th St., New York 16, N. Y. Price, $10.00.* The method of solving linear differential equations originally published by Laplace has been in use by mathematicians for well over a century, but only in recent years have engineers begun to realize its usefulness to them. The Laplace transformation theory is, however, extremely helpful in providing quick solutions to a great range of engineering and physical problems and often saves much laborious calculation by other methods. A physical rather than a purely mathematical vocabulary is used in an attempt to attain the utmost simplicity, and throughout the approach is from analytical methods already well known to the reader. The work is not intended as more than a general introduction to a very large subject, but it is hoped that it will be of value in supplementing the more rigorously mathematical texts that have previously appeared.

(Advertisement)

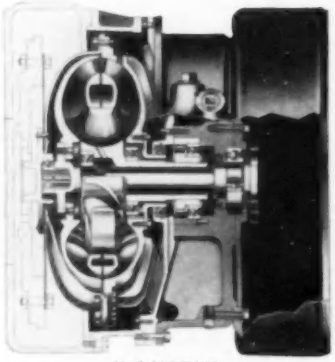
Fuller announces 3 new torque converter couplings

. . . designed for a wide variety of industrial applications

Three new Fuller Torque Converter Couplings nominally rated at 280 foot pounds of torque are now available for increasing work capacity in a wide variety of industrial applications.

The Fuller Industrial Torque Converter Couplings consist of three simple elements; impeller or pump, runner, and reaction member. With single stage two phase design, the reaction member is mounted on an overrunning clutch which permits rotation with the runner, and operation as a straight hydraulic coupling for high efficiency. The change from 2.1:1 conversion stage operation to straight hydraulic coupling stage and back is automatic, depending only upon the amount of torque required in the drive line.

Advantages of the 2.1:1 torque multiplication and smooth fluid coupling operation provided by the new Fuller Torque Converter Couplings include obtaining faster work cycles . . . with less downtime and less maintenance. Typical applications are: fork lift trucks, winches, loaders, self propelled cranes, truck cranes, lumber carriers . . . and diesel and gasoline locomotives.



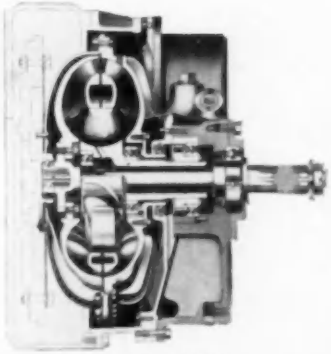
Model 12-T-280

The New 12-T-280

This new Fuller Torque Converter Coupling incorporates an SAE No. 3 clutch housing behind the converter. The output shaft is flanged for attachment of a single plate clutch flywheel.

The New 12-U-280

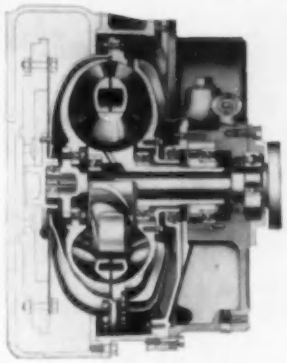
The Model 12-U-280 Fuller Torque Converter Coupling incorporates a 1½" ten-spline shaft on the output end, without clutch housing, for straight line drives through a universal joint.



Model 12-U-280

The New 12-H-280

A new model which incorporates a flange at the output shaft, for attachment of industrial type couplings.



Model 12-H-280

For Tough Tasks— It's Fuller by Far!

Where frequent start-and-stops, or heavy, intermittent shock loads threaten to overwork engines, transmissions, axles, brakes and tires . . . use the fluid cushioning of these new Fuller Torque Converter Couplings to *absorb* and *eliminate* shock loads.

Torque demand is matched to the load through the 2.1:1 torque multiplication of the converter . . . automatically changing to fluid coupling as the load is reduced. These new Fuller Torque Converter Couplings *keep* engines operating in the high rpm range under all conditions of vehicle load and speed.

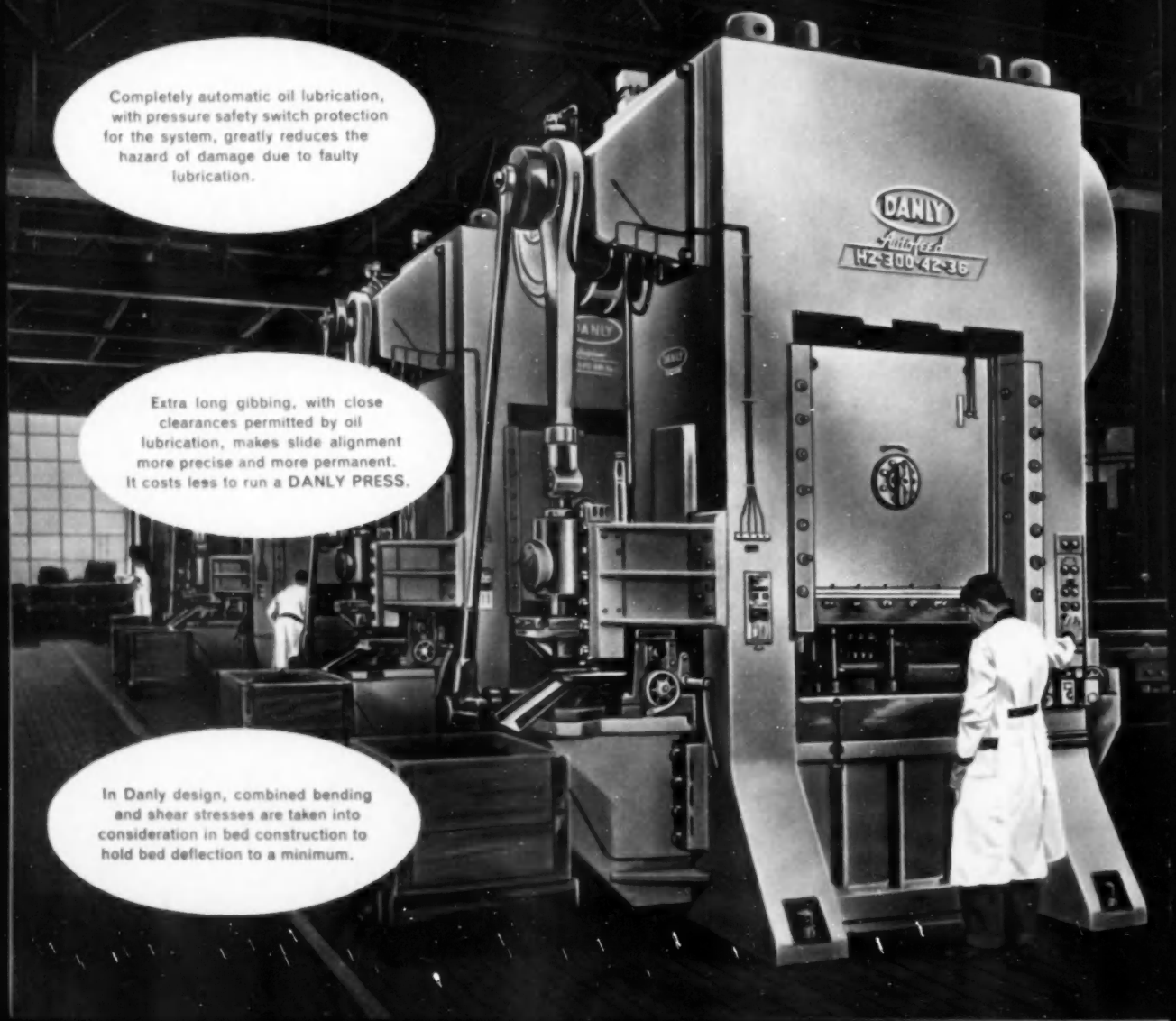
See your equipment dealer *today*. Specify Fuller Torque Converter Couplings in your new equipment for better performance.

FULLER MANUFACTURING COMPANY
TRANSMISSION DIVISION • KALAMAZOO, MICH.

Unit Drop Forge Div., Milwaukee 1, Wis. • Shuler Axle Co., Louisville, Ky. (Subsidiary) • Sales & Service, All Products, West. Dist. Branch, Oakland 6, Cal. and Southwest Dist. Office, Tulsa 3, Okla.

comparison proves

DANLY AUTOFEED PRESSES MAKE HIGH PRODUCTION DIES LAST LONGER



Completely automatic oil lubrication, with pressure safety switch protection for the system, greatly reduces the hazard of damage due to faulty lubrication.

Extra long gibbing, with close clearances permitted by oil lubrication, makes slide alignment more precise and more permanent. It costs less to run a DANLY PRESS.

In Danly design, combined bending and shear stresses are taken into consideration in bed construction to hold bed deflection to a minimum.

USE THIS CHECK LIST

...Compare Danly Presses, feature for feature, with any other press on the market.

COMPARE	FEATURE	DANLY	OTHER
INSTALLATION COSTS	Danly presses are delivered already "run-in" tested. Faster installation is assured by assembly and operation in the Danly plant.	✓	
DRIVE	Danly's cool-running clutch lasts up to 7 times longer. Herringbone type gears and anti-friction bearings on high speed shafts wear longer.	✓	
CONSTRUCTION	Danly presses are made entirely of heavy stress-relieved steel weldments. Extra heavy internal ribbing decreases deflection.	✓	
LUBRICATION	Danly features completely automatic oil lubrication. When any vital area is not being sufficiently lubricated, safety switch stops press.	✓	
MAINTENANCE	Performance records in the country's biggest stamping shops prove that Danly Presses require less maintenance, greatly reduce spare part needs.	✓	
CONTROLS	Special Danly Control arrangements make operation easier and safer, minimize accidental damage, facilitate automation—can be completely enclosed.	✓	

. . . that's the report received from one of the world's leading manufacturers of conveyor systems and materials handling equipment. Their comparison of Danly press features against all others, led them to install Danly Autofeed Presses in critical production lines.

Today, after more than six years of high speed production, these Danly presses have required *no major maintenance*. Set-up men prefer the Danlys too, for their *accuracy* of *slide alignment*. Die-setting is easier and faster. Precision dies are better protected against wear, last longer because *vibration and deflection are greatly reduced*. Exacting piece part tolerances of plus or minus .001 are maintained through continuous production runs. This is in spite of the heavy tonnage requirements of off-center coining, piercing and blanking through three stage dies.

Danly presses can provide you with the same amazing economy and dependability of operation. Use the check list in this advertisement . . . make your own point-by-point comparison and see why Danly presses will give increased production at lower cost.

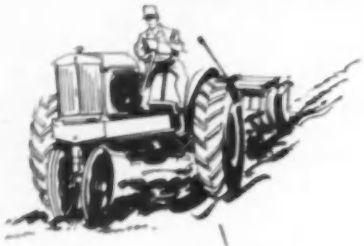
It costs less to run a DANLY PRESS

DANLY MACHINE SPECIALTIES, INC.
2100 South Laramie Avenue • Chicago 50, Illinois

DANLY®

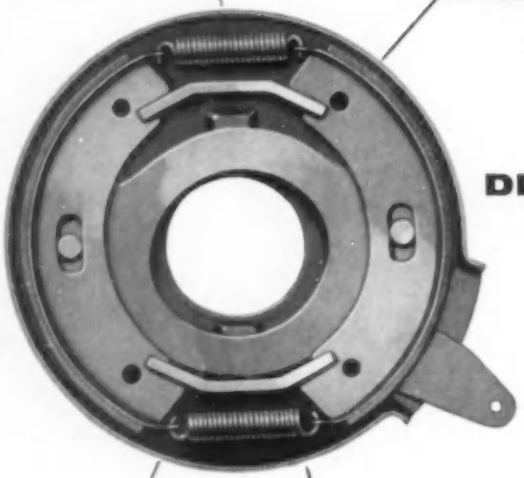
IF IT MOVES

WE CAN STOP IT!



TDA BRAKES

...for better control of heavy-duty industrial and farm equipment!



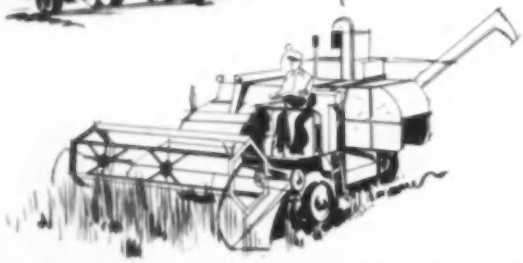
DLM—Revolutionary new all purpose brake

The versatile new DLM offers many improvements previously unavailable on most other present-day brakes. Its simple design utilizes only 8 parts . . . results in considerable savings in weight, installation and maintenance time, and actual material costs.

This new balanced-type brake insures constant, smooth performance in either direction of rotation, and is fully enclosed to protect against dust, dirt, and water penetration, reducing fire hazard . . . prolonging brake life . . . and improving on-the-job performance in all applications.

Exclusive features have greatly minimized service and inventory requirements, saving money for manufacturers and operators of trucks, harvesters, mixers, combines, winches, and many other types of heavy machinery . . . available in all sizes, for any type of work.

If somewhere in your business there is a special braking problem, big or small, we urge you to call on the ingenuity and vast knowledge of TDA engineers to solve it quickly, and at a minimum cost. An inquiry on your company letterhead will receive immediate attention. Just write Timken-Detroit Brake Division, Ashtabula, Ohio.



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Plants at:
Detroit, Michigan • Oshkosh, Wisconsin • Utica, New York • Ashtabula, Kenton and Newark, Ohio • New Castle, Pennsylvania

TIMKEN Detroit BRAKES
TIMKEN-DETROIT BRAKE DIVISION
ROCKWELL SPRING AND AXLE COMPANY
ASHTABULA, OHIO
Accepted Standard

Spring Steel

by SUPERIOR

for the

uniform behavior

you require

in fabrication!

in service!

Uniform, dependable response to your manufacturing processes and subsequent service requirements is outstanding in SUPERIOR Spring Steel. We build uniform behavior into every coil, from specified analysis of composition to final anneal before shipment. We're strip steel specialists: *you gain by it.* Specify SUPERIOR for your spring steel needs!

Superior Steel

CORPORATION

CARNEGIE, PENNSYLVANIA

The world's most powerful tractor —with Torqmatic Drive

TWIN POWER TRAINS—made possible by Allison TORQMATIC DRIVES—make Euclid's new TC-12 the world's most powerful crawler sold today.

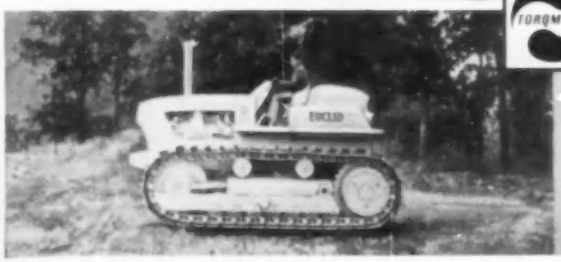
This twin-engine giant gets 388 horsepower from two GM Diesels—uses a pair of TORQMATIC Converter-Transmission teams to turn that power into more than 100,000 pounds drawbar pull and provide a smooth, steady flow of power for all job requirements.

But for all its power the TC-12 is easy to run for it has no master clutch.

The driver changes speeds with finger-tip hydraulic control at full power, instantly shifts from forward to reverse, spins his tractor in its own length, maneuvers with no more than a twist of the wrist.

And he gets more work done per day because with a top speed of 730 feet a minute the TC-12 doesn't crawl—it really moves fast.

You can build or buy a better product by specifying TORQMATIC DRIVES for your hard-working gasoline- or Diesel-powered equipment. Ask your equipment dealer or manufacturer for more information or write direct to Allison Division of General Motors, Box 894A, Indianapolis 6, Indiana.



GM TORQMATIC

Allison
TORQMATIC DRIVES

'56 DeSoto Engine

(*Continued from page* 51)

pump features ball bearing construction for longer life and quieter operation. With power steering, a dual belt drive replaces the single belt from the crankshaft to the water pump and fan, giving added drive capacity and reduced belt stretch and slippage. Also, engine intake valves have an improved oil seal.

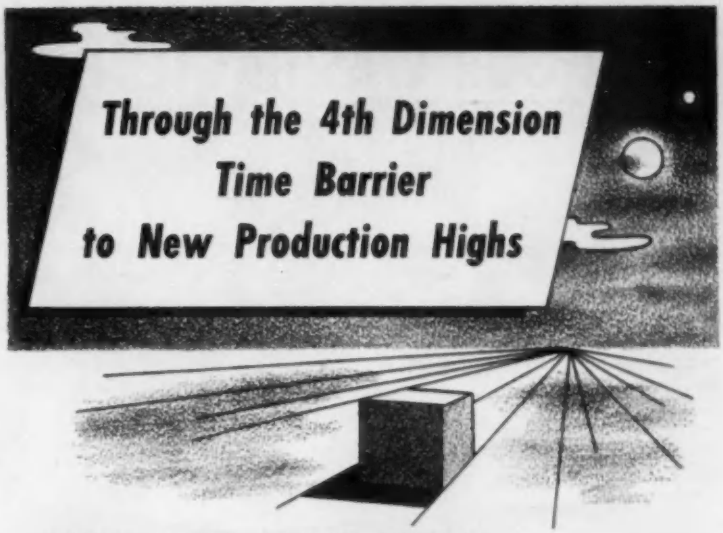
Styling refinements extend from the cross-hatch grille to the up-swept rear fenders with new wrap-around rear bumper. A bolder molding is used, and the tail lights consist of three plastic lenses, one above the other, set into each fender. Outside door handles have been improved by a one piece pull design. Positive acting safety door locks, which provide an interlock between the striker and the lock rotor, are standard on all models. The new rotary deck lid latch now has five lobes instead of four. Windshield wiper pivots have been relocated to permit the blades to wipe further around the corners of the wrap-around windshield. The electric wipers feature a lower slow-speed setting.

Body styles for 1956 are as follows: Fireflite; four-door sedan, two-door Sportsman coupe, four-door Sportsman hardtop, and convertible. Firedome; four-door sedan, two-door and four-door Sportsman, Seville two-door and four-door hardtops, convertible, and station wagon.

Among the interesting new accessories are the high-fidelity record player offered by all of the Chrysler Divs., and a new gasoline-burning heating system which is completely independent of the engine or coolant system.

BOOKS . . .

THE AUTOMATIC FACTORY — A CRITICAL EXAMINATION, *by Stephen A. June, John D. Bardis, Lee H. Lurio, Leonard S. Polaner, Oystein Sagedahl, Herbert A. Skenar, and Bernard K. Yenkin, published by Instruments Publishing Co., Pittsburgh 12, Pa. Price, $1.50.* Here is an unslanted story, a factual report crammed full of case studies with company names. This report attempts to bridge the gap between the theoretical concepts and the actual industrial developments of the automatic factory. It has been written principally for the American businessman in an attempt to clarify and expose the sometimes hypothetical and imaginative writings of scientific and commercial authors. Realism and practicality are the foundation of this report.



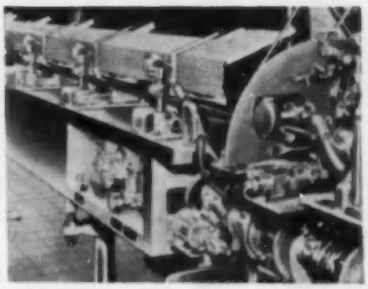
LIPE AML BAR FEED

gears machine production to the steady flow of Time

ALL industrial results are achieved in Time . . . *vital 4th dimension that measures output, costs, profit.* Shorten the time gap between operations . . . shorten the time when machines are "cutting air" . . . keep machines producing at a steady optimum rate during the fatigue slow-down from 10:30 to noon, and from 3 P.M., till closing time . . . *and you are getting 4th Dimension production.* Production that is geared to the steady flow of Time.

Lipe AML Bar Feed Produces from 30% to 100% More Output by Eliminating Time Losses . . .

Time losses account for the enormous differences in output among workmen. By eliminating these losses automatically, the Lipe AML Bar Feed boosts overall production from 30% to 100%. That's because stock is fed to the machine independent of the operator. Constant pressure behind the stock assures uniform speed of feed. No feed fingers to fail or mar stock. No multiple feed-outs, even on the longest pieces.



Mail the coupon now for free literature giving full details on the Lipe AML Bar Feed.

LIPE ROLLWAY

LIPE ROLLWAY CORPORATION
Syracuse 4, N. Y.

Sure, I'd like to know more about the Lipe AML Bar Feed. Send me your free booklet.

Name_____ Title_____

Company_____

Street_____

P.O._____ Zone____ State_____

ON OUR WASHINGTON WIRE

Plant and equipment investment by American business is climbing steadily toward a robust $27.9 billion for 1955. This figure is about three per cent more than was planned at the beginning of the year.

Leasing charges for Government machine tools and equipment to concerns in disaster areas will begin 90 days after delivery. Intention is to assure that payments do not start until all equipment needed for operation is in place.

Navy has disclosed that all new Navy fighters now in production are being fitted with gear which enables them to be refueled in flight. An undisclosed number of carrier squadrons are already fully equipped with the gear.

Guide to aid businessmen in locating exporters, importers manufacturers, and suppliers in foreign countries has been compiled by the Bureau of Foreign Commerce. Called "A Guide to Foreign Business Directories," it is available from the Superintendent of Documents, Washington 25, D. C., at $0.45 a copy.

Centralized buying of many supply items needed by Federal civilian agencies is being started as an economy measure by the General Services Administration. New National Buying Div. of GSA will contract annually for about $336 million worth of vehicles and other equipment.

Dept. of Defense is planning a large research and development program in titanium to supplement its program of the last 10 years.

Senate-House Committee on Internal Revenue Taxation is taking its first step in a congressionally-directed study of renegotiation. It is asking for written views on whether the law should be extended beyond next Dec. 31.

More than 200 sources of information on iron and steel are listed in a new government business bulletin, "Basic Information Sources On Iron and Steel." Copies of the leaflet are available at all field offices of the Dept. of Commerce.

Internal Revenue Service has ruled that delivery of new and used automobiles and trucks by the drive-away method, under which the transporting concern supplies only drivers, does not constitute transportation of property for tax purposes.

Chicago RIVET "912"
AUTOMATIC RIVET SETTER
CUTS COSTS 3 WAYS

1 FASTENS FASTER . . .
Only the speed of the operator limits the 912's riveting speed. Completely automatic. A push on the foot pedal automatically feeds, inserts and clinches the rivet.

2 DOES WORK OF SEVERAL MACHINES
Quick change rotary hopper and raceway makes the 912 adjustable in 5 to 10 minutes to set different size rivets. Adjustable anvil height and 12-inch throat provide further versatility.

3 SAVES ON MAINTENANCE . . .
The 912 is massively built to stand the shocks of constant use and is designed for quick, easy servicing and parts replacement.

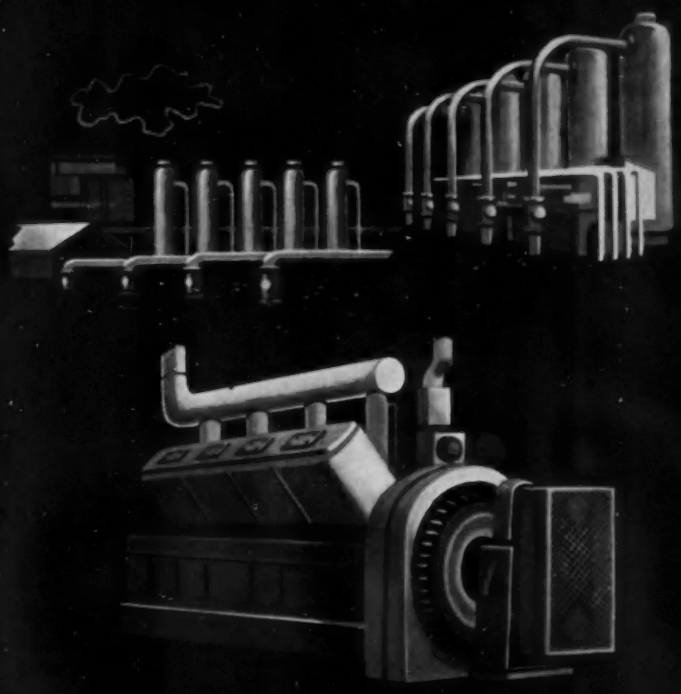
If your assembly calls for 3/16" steel tubular rivets or smaller, of 15/16" lengths or less, ask us to show you how the 912 can cut your fastening costs. Send a sample of your problem assembly (or blueprint) for a free fastening analysis.

FREE CATALOG
contains valuable engineering information and rivet specifications plus illustrated descriptions of 26 Chicago Automatic Rivet Setters.

Chicago Rivet & MACHINE CO.
9612 West Jackson Boulevard, Bellwood (Chicago Suburb) Illinois
Branch Factory: Tyrone, Pa.

BEARINGS...

A Control Factor in Performance!



RESEARCH • DESIGN • METALLURGY • PRECISION MANUFACTURING

One of our biggest product transportation systems is seldom seen . . . because it lies below the surface. Countless miles of pipelines carry gases and fluids to every corner of the country. Gas, gasoline and diesel engines are the muscles that power the pumping and delivery systems. Our contribution to this day-in, day-out operation is the manufacture of quality bearings for engine dependability. We are a supplier to America's builders of industrial engines. **FEDERAL-MOGUL DIVISION,** Federal-Mogul-Bower Bearings, Inc., Detroit 13, Michigan.

FEDERAL-MOGUL
DIVISION

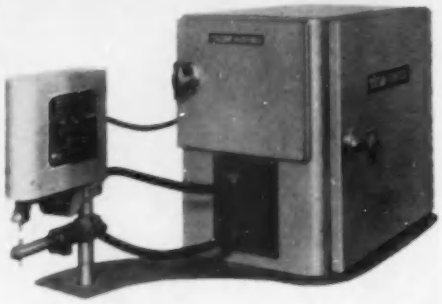
SINCE 1899

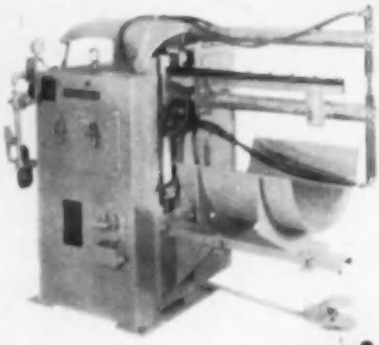
FEDERAL Mogul

STANDARD ★ MODIFIED ★
SPECIAL RESISTANCE WELDERS

Standard Resistance Welder

Efficient for all basic uses; low operating cost, prompt delivery, long service.



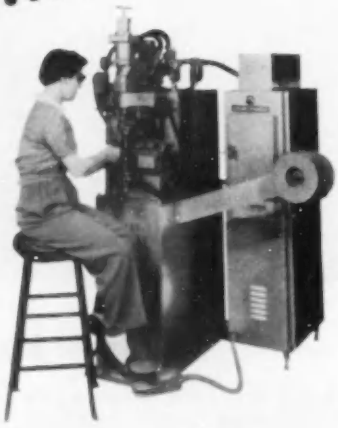


Standard Resistance Welder With Special Tooling

Modified to suit your requirements; increased production, low cost retooling.

Special Resistance Welder

Built for your specific needs; mass production of special products at lowest cost per unit.



Resistance Welders Since 1898

Sales and Service

CHARLOTTE • CHATTANOOGA
CHICAGO • CLEVELAND • DALLAS
DAYTON • DENVER • DETROIT
LOS ANGELES • PHILADELPHIA
PORTLAND, OREGON
SEATTLE, WASHINGTON
ST. LOUIS • STAMFORD
OAKVILLE AND WINDSOR, ONTARIO

TAYLOR-WINFIELD
RESISTANCE WELDERS
SPOT • PROJECTION • SEAM • FLASH-BUTT

THE TAYLOR-WINFIELD CORPORATION WARREN, OHIO

Studebaker-Packard

(*Continued from page* 57)

352 cu in. V-8 engine, plus Ultramatic transmission, for a very high power-weight ratio.

Features in 1956 will include a new finned brake drum on the President and Hawk series that is said to provide better cooling and greatly improved anti-fade characteristics. Also new for 1956 is a new type "safety eye"' speedometer positioned for maximum visibility on top of the instrument panel directly in front of the driver with large numbers to enable the driver to read speed instantly.

Both Studebaker and Packard will be equipped with new safety door latches. Seat belts also will be offered as optional equipment.

Studebaker also revealed its truck line for 1956 with restyled cabs. The line will have increased horsepower and will cover the one-half to two-ton commercial classes.

Cost of developing the 1956 Studebaker-Packard line of cars and trucks was about $100 million, according to James J. Nance, president of the corporation. Mr. Nance said that total capacity of both divisions is about 470,000 units, of which 350,000 is Studebaker and 120,000 Packard.

Carbide Ball Setup

(*Continued from page* 72)

countered does not change the ball size a significant amount.

This same type of hole sizing, also using a carbide ball, is done on some steel-backed bronze bushings but for this operation a screw press is employed. Precise sizing of the hole is attained but there is also a corresponding increase in the OD of the bushing. Such work is done rapidly and costs are below those for using a burnishing bar.

Still another job of hole sizing is done with a carbide ball that is forced through the holes in steel flanges in a screw press. In this case, the flange is held in a fixture arranged for rapid indexing so that holes are quickly brought into line with the punch that forces the ball through each hole in succession.

All hole sizing operations done with carbide balls in this plant yield excellent results and have effected substantial savings over prior methods of attaining similar results. There are also the advantages that the equipment needed is low in cost, with balls having remarkably long life.

Be Emphatic!

Specify

GM STEEL TUBING

By Rochester Products

GM STEEL TUBING BY ROCHESTER PRODUCTS, DIVISION OF GENERAL MOTORS, ROCHESTER, N.Y.

Progressive Engineering

Makes the Difference

DELCO-REMY DEVELOPS A NEW DELCO DRY CHARGE BATTERY WITH INSTANT POWER

Delco-Remy's new Delco Dry Charge Battery is the freshest power anyone can buy! Not a fraction of its power is lost in transit or storing because the Delco Dry Charge Battery is manufactured by a revolutionary new method. It is not activated until electrolyte is added. Then, instantly, it's ready to go—full of power!

Although dry charged batteries are not new, their practical application is. In the past, one of the major problems was the unavailability of electrolyte in convenient quantities. Delco-Remy licked this problem with an ingenious shipping container designed to meet all commercial requirements. It holds the amount of pure electrolyte required by the battery . . . it's disposable . . . it eliminates the necessity of buying large quantities of bulk electrolyte.

Another problem with early dry charged batteries was the "boost" they required to reach full charge after being filled. Delco-Remy solved this by the use of quick-wetting, long-lasting microporous rubber separators, and by the development of a continuous charging, washing, drying, and assembly process. All this insures a high, uniform quality not possible under old-fashioned batch procedures.

These and many other features of the new Delco Dry Charge Battery—such as the exclusive Delcoloy grids and Thermorigid hard rubber case—insure outstanding battery performance and life in use, and greatly simplified initial storage.

The new Delco Dry Charge Battery is one of the more recent results of Delco-Remy's policy of progressive engineering that is always abreast . . . often ahead . . . of the industry.

Delco-Remy
ELECTRICAL SYSTEMS

DELCO-REMY • DIVISION OF GENERAL MOTORS • ANDERSON, INDIANA

Design Hints for Providing Corrosion-Resistant Aircraft Structures

1. Plate or judiciously paint stainless steel parts in contact with aluminum so as to reduce corrosion of the aluminum.

2. Do not install small aluminum clips on large stainless steel webs. Use clips of stainless steel.

3. Use stainless steel fasteners in stainless steel assemblies in place of cadmium-plated alloy steel fasteners.

4. Use stainless steel hydraulic fittings with stainless steel tubing.

5. Insulate or isolate dissimilar metals wherever possible. If complete insulation cannot be achieved, use paint, plastic, or elastomers in the faying surfaces to increase the corrosion-resistance of the joint. Do not, by any means, use wicking materials.

6. Anodize or passivate parts that are spotwelded (after spotwelding) where prior surface treatment is impossible.

7. Avoid absorbent materials in lap joints.

8. Seal edges of faying surfaces or butt joints with a sealing compound to prevent entrance of moisture.

9. Avoid curved areas, sharp corners, stagnant areas, and other areas where moisture and precipitants may accumulate.

10. Provide adequate drain holes.

11. Paint all cut edges.

12. Select combinations of metals as close together as possible in the galvanic series.

Maintenance and Inspection Hints for Retarding Corrosion

1. Thoroughly check unpainted surfaces and touch up as required at each inspection period. Carefully check seams, lap joints, crevices, and other areas where moisture or dirt can collect. Areas subject to exhaust gases require close scrutiny.

2. Prescribe careful cleaning procedures to remove dirt and dust particles, because moisture tends to collect at these points.

3. Cover vent scoops when airplane is being washed.

4. Since moisture energizes corrosive action, thoroughly inspect areas where water is apt to collect after washdown. Wipe these areas dry, or dry them with an air hose.

5. Mark off magnesium parts when using brightening agents. These agents contain chemicals that attack magnesium alloys.

6. When inspecting areas containing control rods, bellcranks, quadrants, actuators, and sealed bearings, check for break in corrosion-preventive treatment.

7. Do not apply corrosion preventives over corrosion products.

8. Corrosion may attack metal even though it is painted since, upon prolonged exposure, moisture can penetrate the paint. Affected areas are characterized by a scaly or blistered appearance.

9. If battery acids are spilled, wash immediately with a dilute solution of sodium bicarbonate in water. After allowing to dry, remove all traces by thoroughly rinsing with water.

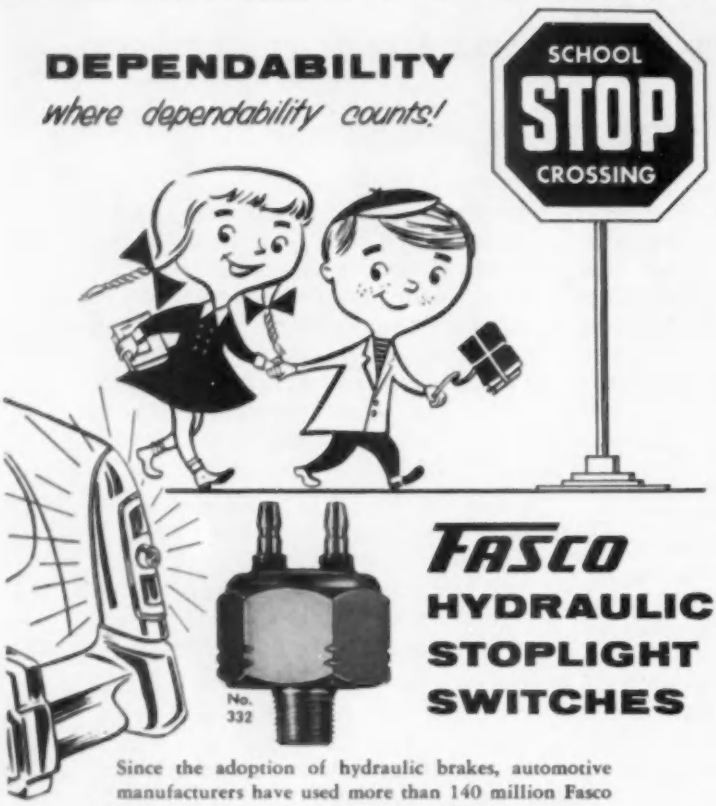
10. Thoroughly inspect all plated bolts before reinstallation. Scored bolts should not be reinstalled.

11. When sealing faying surfaces,

(*Turn to page* 132, *please*)

DEPENDABILITY

where dependability counts!



FASCO HYDRAULIC STOPLIGHT SWITCHES

Since the adoption of hydraulic brakes, automotive manufacturers have used more than 140 million Fasco Hydraulic Stoplight Switches . . . PROOF that when you want dependability, ruggedness and an extremely high safety factor, it pays to *CONSULT* **FASCO** *. . . FIRST!*

AUTOMOTIVE DIVISION

FASCO INDUSTRIES, INC.

ROCHESTER 2, NEW YORK

DETROIT OFFICE—12737 PURITAN—PHONE: UN 17476

your best bet... BSA single spindle automatic screw machines

for fast, economical single spindle bar work up to 2" diameter

The 2" BSA Single. Note open operating area for ample chip clearance and tooling accessibility.

- BSA Tools Ltd. of England, one of the world's oldest and largest machine tool builders, have produced and distributed thousands of these BSA "Singles" since they introduced them in 1926.
- Available in five standard capacities: ½", ¾", 1", 1⅝", and 2".
- All models use STANDARD AMERICAN TOOLING.
- Wide range of spindle speeds —200 to 6000 on ½" machine, 69 to 1260 on 2" model.
- Cams, change gears and tooling easily accessible for quick job-to-job changeover.
- Unit construction provides quick access for easy maintenance.
- Special spindle mounting, designed to reduce wear.
- Cross slides and turret mounted on replaceable ways.
- Positive chain drive from gear box to spindle prevents slippage.

distributed and serviced in U.S.A. by NATIONAL ACME

Since their introduction in this country, BSA Single Spindle Automatic Screw Machines have enjoyed remarkable acceptance. Combining latest automatic screw machine principles with proven design, they have produced at top standards of speed and accuracy with minimum upkeep.

BSA "Singles" are distributed and serviced in the United States by National Acme, in Cleveland, where adequate replacement parts are stocked —and you get the same active, experienced and interested service support as that on which National Acme's reputation has been built.

For specifications on all sizes, write for Bulletin BSA-54

OUR JOB: to provide the *Right Machine* for YOUR JOB

Acme-Gridley 4, 6 and 8 Spindle Automatic Bar and Chucking Machines • Fully Automatic Turret Lathes (Bar and Chuck Type) • Hydraulic Thread Rolling Machines • Automatic Threading Tools • Switches • Solenoids • Contract Manufacturing.

THE NATIONAL ACME COMPANY

173 EAST 131st STREET • CLEVELAND 8, OHIO

Press operator Hannah Jones, who has worked presses of different makes for several years, prefers this 100-ton Warco to anything she has operated. Here she shows Personnel Director Myron Timms one of the reasons why—the increased production of tractor muffler heads

"Since We've Tried WARCO Presses We've Bought Nothing Else" - - Says Leading Automotive Muffler Manufacturer

Company That Operates 130 Presses Has Purchased Only Warco Equipment Since 1951

The MacKenzie Muffler Co., Inc., is recognized as one of the nation's leading designers and builders of mufflers for the automotive industry. In the manufacture of their product the blanking and forming press plays an important part. In fact, this concern has more than 100 presses in daily use. In 1951 they decided to try their first Warco Press. They watched it closely, recording production and maintenance figures. "It sold itself to us," say company officials, "so well that we have purchased nothing but Warcos since."

Warco quality is like that. Once you compare you'll discover that Warco Presses outperform them all. It will pay to let your Warco representative know the next time you're in the market for press equipment.

Federal WELDERS

Warco PRESSES

THE FEDERAL MACHINE AND WELDER CO.
WARREN, OHIO

News of the MACHINERY INDUSTRIES

(*Continued from page* 87)

Keller, Charles T. Lanham, L. D. Silberstein, Thomas J. Stevenson, Jr., Sidney A. Stewart, Ernest Stroheim, and Milton C. Sapinsley.

The officers are: L. D. Silberstein, chairman of the board; Alexander H. d'Arcambal, president and general manager; Richard W. Banfield, vice president & manager of Small Tool and Gage Divisions; Ernest Stroheim, vice president-financial; Sidney A. Stewart, vice president & manager of Chandler-Evans Division; Alexander S. Keller, vice president & general sales manager; A. L. Knapp, vice president and manager of Machine Tool Division; Jacob J. Jaeger, vice president, chief engineer of Machine Tool Division; David R. Anderson, controller; Louis Reiss, treasurer; Seymour M. Heilbron, secretary.

The officers of Potter & Johnston Co., are the following: Alexander H. d'Arcambal, chairman of the board; Edward P. Gillane, president and general manager; J. Potter Cunningham, vice president-sales; Ernest Stroheim, vice president-financial; Wilfred J. Pender, vice president and factory manager; Louis Reiss, treasurer; and Seymour M. Heilbron, secretary.

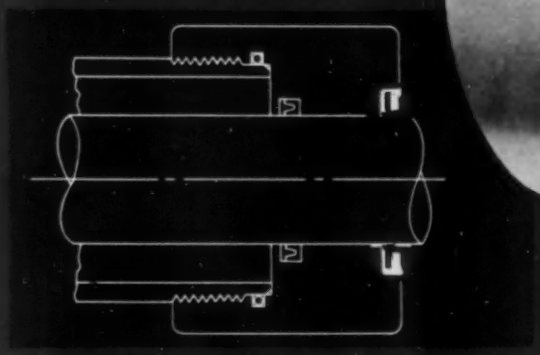
NRL Features "Hot" Milling Machine

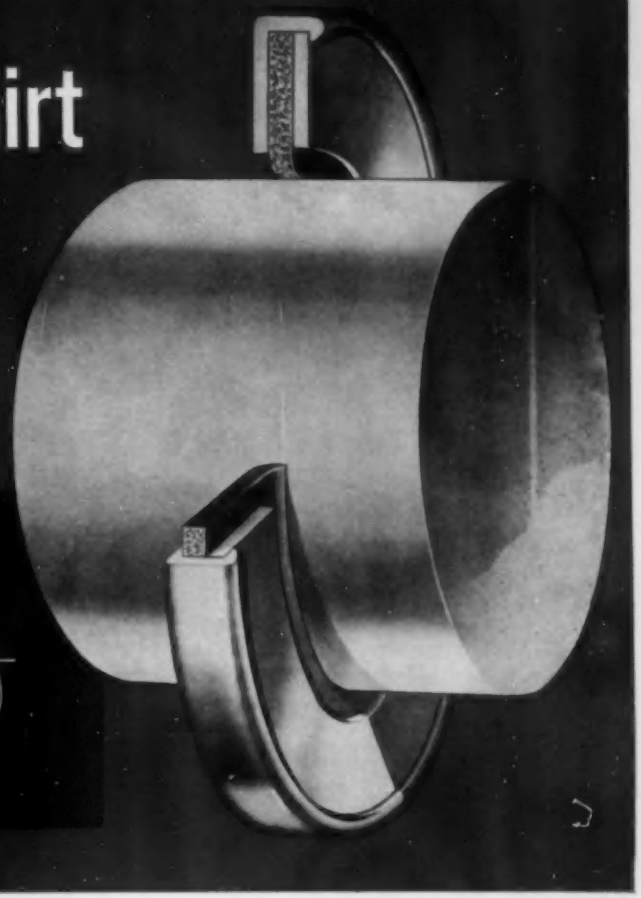
At the new laboratory for radioactive materials of the Naval Research Laboratory, a milling machine has been installed in a hot cell. The machine, since it handles radioactive specimens, is operated by remote control from the outside of the cell. A stepped shaft connects the operating mechanisms on the outside with the machine itself on the inside.

A Slip

Recent correspondence with Barnes Drill Co. indicates that for the past two years all Barnesdril honing machines have been equipped with Barnesdril honing tools and fixtures as standard equipment. Attention is drawn to an author's error in captioning the Barnesdril honing machine installed at the McKinnon Industries plant in St. Catherines, Ontario (See AI, August 15, 1955). All of the accessories on this equipment—honing head, honing tools, abrasives, and fixtures—were supplied by Barnes.

Wipes out dirt for life!





WEAR-SAVERS THAT WON'T STEAL POWER

Hydraulic cylinder makers use Chicago Rawhide's Type G wiper seals for many reasons. Here's one: the special Sirvis leather wiper element holds its own lubricant—operates at low friction. This means negligible power loss. Another advantage: the Sirvis leather element will not trap grit and carry it—will not score the shaft. Years of dependable performance have demonstrated the ability of C/R Type G Oil Seals to exclude dirt, dust and moisture. They may be the answer to your problem, too. Write for your copy of "C/R Perfect Oil Seals."

C/R

PERFECT

Oil Seals

More automobiles, farm and industrial machines rely on C/R Oil Seals than on any similar sealing device

CHICAGO RAWHIDE MANUFACTURING COMPANY

1301 Elston Avenue OIL SEAL DIVISION Chicago 22, Illinois

IN CANADA: MANUFACTURED AND DISTRIBUTED BY SUPER OIL SEAL MFG. CO., LTD., HAMILTON, ONTARIO

EXPORT SALES: GEON INTERNATIONAL CORP., GREAT NECK, NEW YORK

Other **C/R** *products*

SIRVENE: (Synthetic rubber) diaphragms, boots, gaskets and similar parts for critical operating conditions • CONPOR: Controlled porosity mechanical leather packings and other sealing products • SIRVIS: Mechanical leather boots, gaskets, packings and related products.

(*Continued from page* 128)

be sure a small fillet of the sealant is exposed at the edge of the faying surfaces; when sealing butt joints, be sure space provided between joints is sealed.

AIRBRIEFS

(*Continued from page* 108)

exclusively of the item of taxes.

Small business firms (those employing less than 500 people) received more than $2.0 billion, which represents 43 per cent of all outside purchases placed by 35 major aircraft manufacturers who participated in a survey by the Aircraft Industries Association.

The AIA survey disclosed that the suppliers and sub-contractors contributing products and services to the aircraft industry are spread across the 48 states of the Union. Leading the nation is California, where the aircraft industry supports an industrial complex of 10,314 sub-contractors and suppliers. Ohio is in second place with 4487; New York third with 3382; followed by Texas with 1615; and Connecticut with 1513.

Good Temperature Control is essential

. . . TO HEAVY DUTY POWER!

Vernatherm thermostats assure *correct* operating temperature.

Solid charged and precision built, these thermostats have proved themselves in the field over and over again. They have proved that rough duty and rigid limitations need not mean frequent thermostat replacement!

Detroit Controls Corporation pioneered Vernatherm thermostats to meet the needs of modern pressurized cooling systems. They have solved a great number of tough problems on Diesel, heavy-duty gasoline and jet engines. Vernatherm controls might be the solution to a situation in *your* engines .

Call on DETROIT sales engineers for test data and actual field results . . . or write for Bulletin 213 which gives basic data on Vernatherm controls and their function in modern engine design.

DETROIT CONTROLS CORPORATION
9900 TRUMBULL AVE. DETROIT 8, MICHIGAN
Division of AMERICAN RADIATOR & STANDARD SANITARY Corporation

Representatives in Principal Cities
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RAILWAY AND ENGINEERING SPECIALTIES, LTD.
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AUTOMATIC CONTROLS FOR REFRIGERATION • AIR CONDITIONING
DOMESTIC HEATING • AVIATION • TRANSPORTATION • HOME APPLIANCES • INDUSTRIAL USES
SERVING HOME AND INDUSTRY
AMERICAN-STANDARD • AMERICAN BLOWER • CHURCH SEATS & WALL TILE • DETROIT CONTROLS
KEWANEE BOILERS • ROSS EXCHANGERS • SUNBEAM AIR CONDITIONERS

Radar Altimeter Aids Uranium Prospector

"Strike it Rich," Vernon J. Pick of Saratoga, Calif., one of the favored few uranium prospectors, is not resting on his already assured wealth. He continues to prospect in a modern way and has installed a Raytheon radar altimeter in his Aero Commander airplane.

The instrument gives an accurate reading of the plane's height above ground. Thus when towing a scintillometer (device which measures variations in natural radioactivity of the earth) to prospect for uranium, Mr. Pike can correlate its readings with altitude above ground to produce a chart of the radioactivity in the area under survey.

Radioactivity is stronger closer to the ground. Use of the radar altimeter provides a margin of safety when making spot checks. By presetting it a light will flash in the cockpit whenever the airplane goes below a certain altitude. Thus warning the pilot to pull up or level off.

Conventional altimeters are essentially calibrated barometers which utilize air pressure as a function of height. Set for barometric pressure at sea level they indicate height above sea level. The radar or electronic altimeter measures the time it takes a speed-of-light signal to travel downward to the surface of the earth and reflected back to the plane. The time difference (micro-seconds) is accurately measured and recorded in feet of altitude.

Decca Navigation For Helicopters

Decca, a British developed radio navigational system, is being proposed by Bendix Aviation Corp. as the ideal helicopter aid. The range of the system is unaffected by altitude and operates when flying low behind hills or making let-downs among high buildings. Used with a Flight Log display it produces a continuous record of the position of the helicopter on a special chart of the area over which it is flying.

The Decca Navigator System has been in use on ships, aircraft and ground vehicles for several years in England and Western Europe. A typical installation uses one master transmitter and three slave stations located from 60 to 100 miles from the master station. A position fix is obtained from signals received from the master and any one of the slave

(*Turn to page* 136, *please*)

you've never seen *this one* before!

LAPOINTE now offers this

SINGLE RAM VERTICAL

BROACHING MACHINE

with **electro-motive drive!**

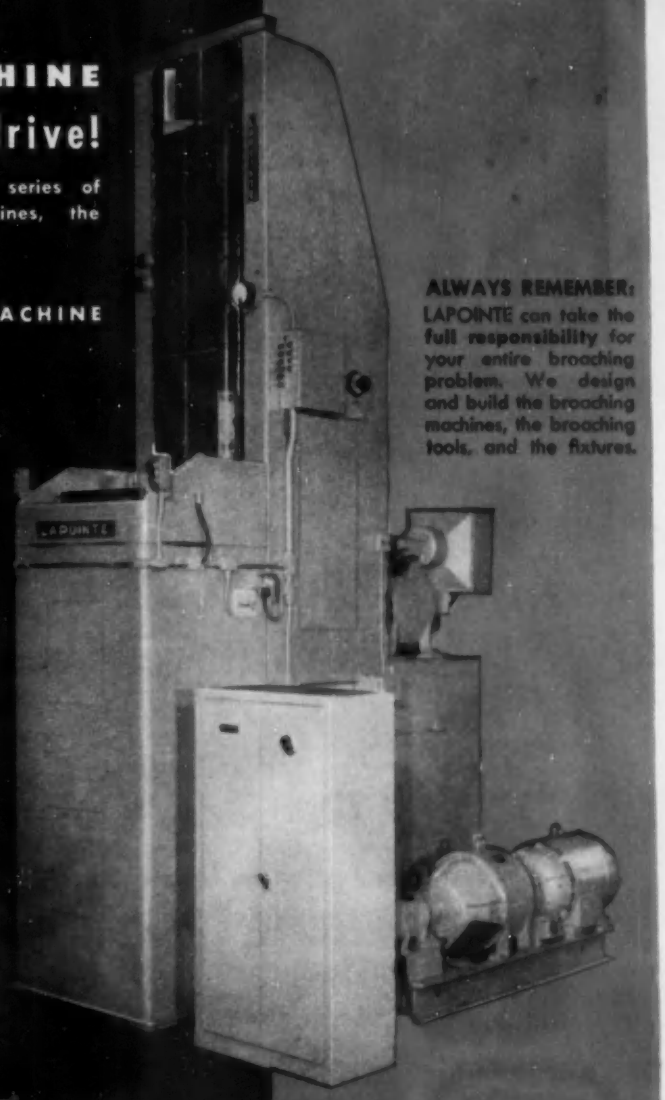
As a new addition to our impressive series of electro-motive driven broaching machines, the

brand new **SRVE**

LAPOINTE BROACHING MACHINE

has a 100-inch stroke
50 h.p. motor

Built with a massive, rugged frame and driven by a powerful bull gear, this new Lapointe Broaching Machine not only offers outstanding production capacity but it also produces a quality of finish that will amaze you. That's because its steady, powerful stroke permits no chatter. And "no chatter" also means that your broaches will last 4 to 5 times longer, between grinds.



ALWAYS REMEMBER: LAPOINTE can take the **full responsibility** for your entire broaching problem. We design and build the broaching machines, the broaching tools, and the fixtures.

You can get full information about this new Lapointe machine by writing for BULLETIN SRVE-10

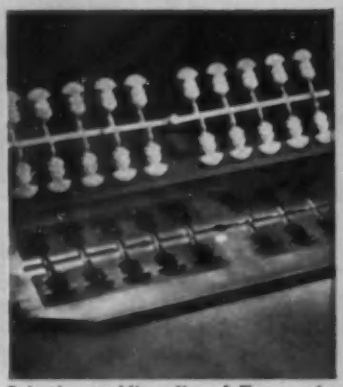
THE **LAPOINTE** MACHINE TOOL COMPANY

HUDSON, MASSACHUSETTS • U. S. A.

In England: Watford, Hertfordshire

THE WORLD'S OLDEST AND LARGEST MANUFACTURERS OF BROACHING MACHINES AND BROACHES

How much money can



Injection molding dies of Epon resin (left) reduce costs 80% for Adams Plastic Products, Cincinnati, Ohio. Duplicate patterns (center) are made to close

tolerances with Epon resin by Crane Company, Chicago, Ill. Epon resin dies for outboard motor housing (right) are one-third cost of comparable metal dies

for Clinton Machine Company, Maquoketa, Ia. Formulations for these three applications supplied by Kish Industries, Inc., Lansing, Mich.

Epon resin gives you these advantages for making tools and dies . . .

- Cast and cured at room temperature . . . no special equipment needed
- Cast to close tolerances . . . less machining and handwork
- Easily duplicated and altered . . . short production time

Epon resins are the epoxy polymers made exclusively by Shell Chemical Corporation.

Epon resin stretch dies developed and used by Lockheed Aircraft Corporation, Burbank, California, show high dimensional stability and strength.

Toy models of Epon resin made by Ber-Design Associates, Irvington, N.J., stand up in duplicating machine during hob-making process at Columbia Engineering Company, Newark, N. J.

you save using

EPON® RESIN

to make TOOLS and DIES?

New resin can reduce tool production costs by 80%

PLASTIC TOOLING now has graduated from the short-run experimental stage to the profitable production stage . . . thanks to the unusual physical properties of Epon resin.

Saves time and labor

Little machining and handwork are required to finish Epon resin tools, dies, and patterns, because the material can be cast to very close tolerances. No specialized equipment is needed, because Epon resin tools are cured at room temperature.

Tools resist wear

Other advantages of Epon resin tools are that they withstand great pressures, are unaffected by chemicals and a wide range of temperatures, and maintain a high resistance to abrasion and corrosion.

Where Epon resin tools are used

Draw dies, drop-hammer dies, and injection molding dies for polystyrene . . . are some of the Epon resin tools now serving a variety of industries. Drilling, welding, routing and checking fixtures, foundry patterns, and vacuum-molding dies . . . all made of Epon resin, are also in daily production.

Find out more

Savings of 80% over the cost of comparable metal tools have been reported by tool- and die-makers. How much can you save in your operations? Best way to find out—write for technical literature on the use of Epon resin in tool and die applications.

SHELL CHEMICAL CORPORATION

CHEMICAL PARTNER OF INDUSTRY AND AGRICULTURE

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Atlanta • Boston • Chicago • Cleveland • Detroit • Houston • Los Angeles • Newark • New York • San Francisco • St. Louis

IN CANADA: Chemical Division, Shell Oil Company of Canada, Limited • Montreal • Toronto • Vancouver

AIRBRIEFS

(*Continued from page* 132)

stations. Under the worst of weather conditions it is reported that for a distance of 50 miles from the master station a position accuracy of 25 yards is achieved.

Super Aero Commander — Model 680

Aero Design & Engineering Co. of Oklahoma City is starting production for 1956 delivery on a new model Aero Commander, the 680. This executive airplane is powered by two Lycoming engines each developing 340 hp for takeoff; 320 hp normal rating. It is capable of a top speed of 260 mph and will cruise at 230 mph at 10,000 ft with 70 per cent power.

In addition to the high cruising speed, other improvements over previous models have been made to meet the demands of flying business executives. Maximum range is increased to 1600 miles (non-stop) which makes it possible to span the continent with only one stop. Seating arrangements are flexible for six or seven people or a five-place arrangement with two full length lounges, an ice box, toilet and tuck-away table. All seats can be removed in 15 minutes to convert the plane for cargo use.

For the higher altitudes (above 12,000 ft) a special console oxygen system is installed as standard equipment.

DC-3's Fly on and on

While the aircraft industry searches for a DC-3 replacement, this twin engined, 21 passenger, early workhorse of the airlines continues to do yeoman service. Many DC-3's have been modified into executive type aircraft with plush accommodations for the corporate owner. Others are used by short-haul and feeder airlines to serve local demands for air travel, mail, express and cargo. Some of these have been changed to incorporate self contained steps, etc., to expedite loading and unloading of passengers.

Hawaiian Airlines are now converting their fleet of Douglas DC-3's to provide deluxe comfort, convenience and safety factors. With some DC-3's, now 20 years in service, it is a tribute to the designer and builder to realize their basic structure continues through the years to be reliable and airworthy.

Emergency Power For XF8U-1 Jet Fighter

The Chance Vought XF8U-1 Day Fighter, newest of the Navy's jet fighter aircraft, is equipped with a Marquardt ram-air emergency power package designed to control the airplane home if all other power supplies should fail.

The emergency power unit was developed and produced by Marquardt Aircraft Co. in close cooperation with Chance Vought. It supplies both electrical (alternating and direct current) and hydraulic power, sufficient to maintain flight control and communication through all speeds from supersonic down to safe landing.

It was developed to operate as a "drop-out" type in which a trigger pushes the machine out into the air stream and the air turbine starts rotating immediately to drive the hydraulic pump and electrical generator.

AUTOMOTIVE INDUSTRIES KEEPS YOU INFORMED

DOLE DV

THERMOSTATS

the accurate temperature control for modern engines

Highly developed for positive operation against the increased pump pressures in sealed cooling systems, and with all types of antifreeze solutions. Helps maintain best engine performance —speeds warm-up—saves gasoline and oil—reduces wear. Gets more heat from the car heater.

Now standard equipment on thirty-four (34) leading makes of cars, trucks, tractors, commercial vehicles, industrial and marine engines.

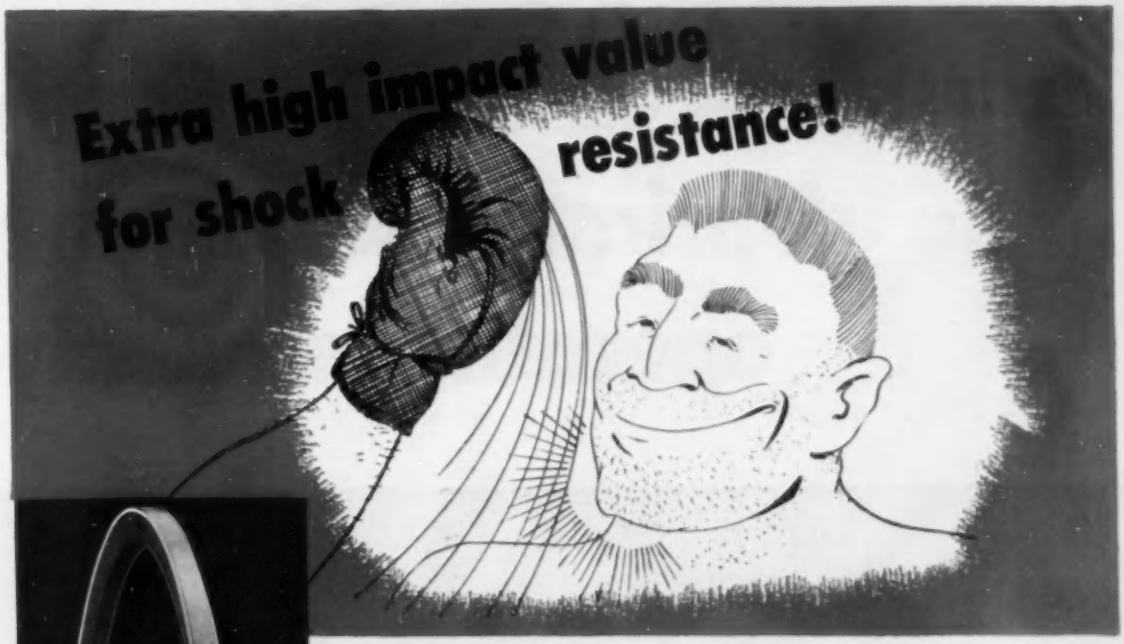
Literature sent on request—please use your letterhead.

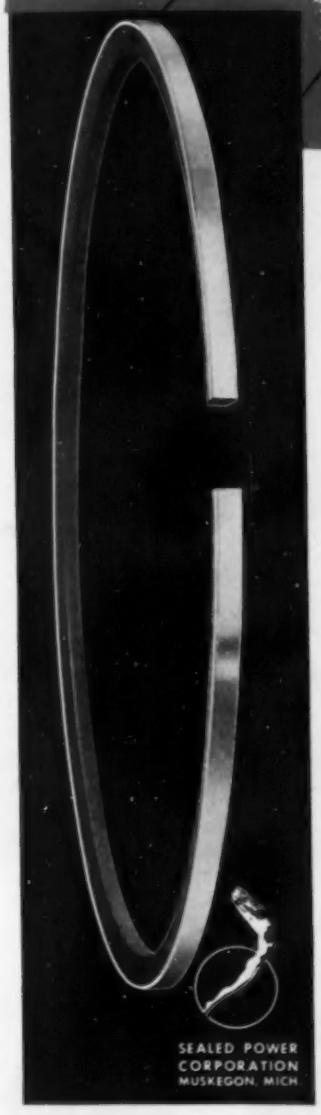
Control with Dole TRADE MARK DOLE

THE DOLE VALVE COMPANY

1901 W. Carroll Ave., Chicago 12, Ill.

Detroit • Los Angeles • Philadelphia





Cyclan

RING IRON

now used in passenger cars!

- Cyclan has extra high impact value for resisting shock.
- Cyclan combines the wearing quality of cast iron with the strength of steel.
- developed by Sealed Power metallurgists and exclusive with Sealed Power.
- outperforms any ring in the top groove
- available with or without chrome facing.

AMONG CYCLAN'S MANY ADVANTAGES...

- Cyclan retains the bearing characteristics of cast iron.
- Cyclan rings retain their true shape even after considerable deflection.
- Cyclan rings are especially durable in super-charged engines.
- Cyclan can be readily chrome-plated, but functions efficiently without plating.
- Cyclan is available for original equipment rings in heavy duty engines and passengers cars.
- Some Sealed Power Cyclan Ring Sets are available for replacement use now. Others will follow soon.

LET OUR ENGINEERS TELL YOU THE CYCLAN STORY!

SEALED POWER CORPORATION • MUSKEGON, MICHIGAN
ST. JOHNS, MICHIGAN • ROCHESTER, INDIANA

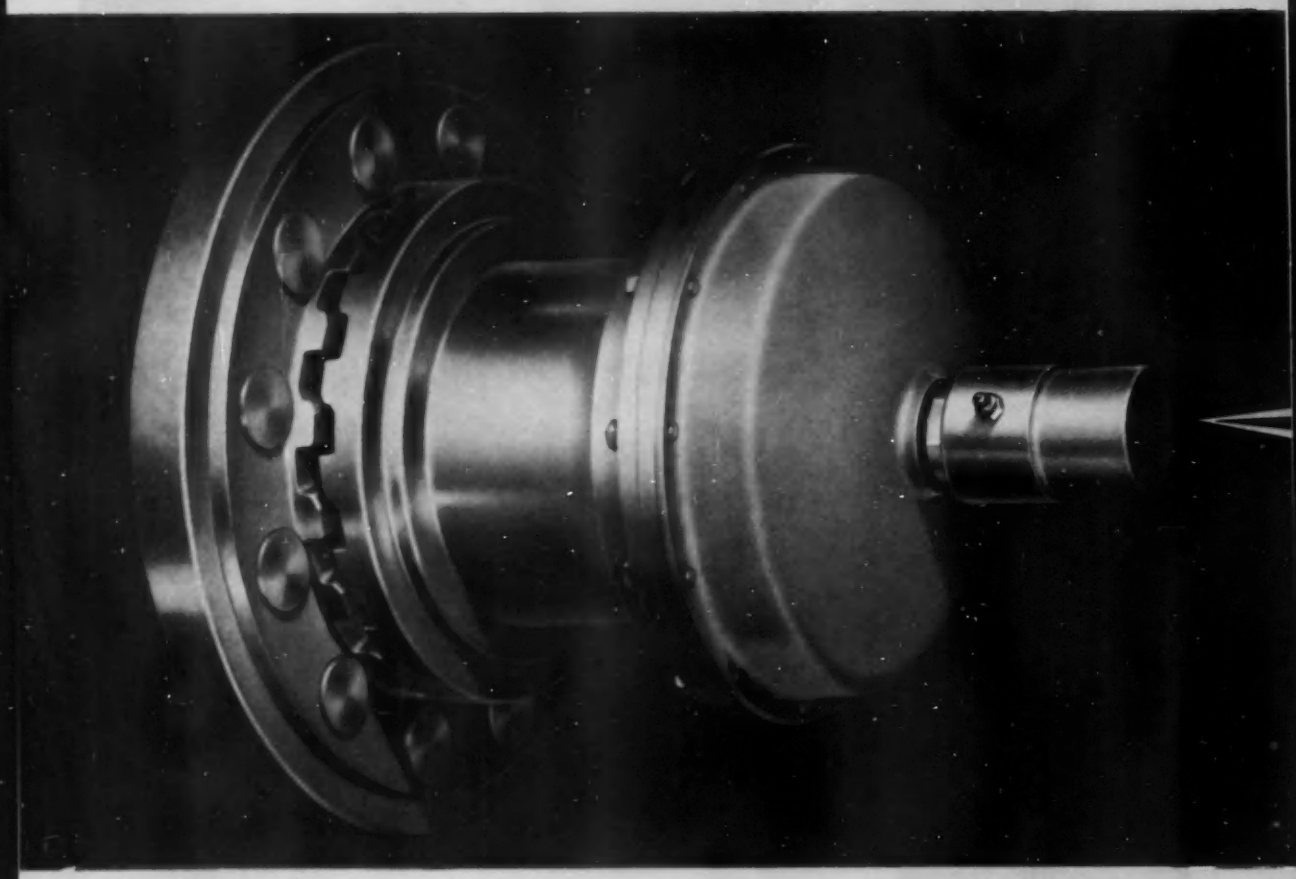
Sealed Power Piston Rings

PISTONS • CYLINDER SLEEVES

Leading Manufacturer of Automotive and Industrial Piston Rings since 1911
Largest Producer of Sealing Rings for Automatic Transmissions • Power Steering Units

Exclusive NIAGARA Electro-

A prime factor in the operating economy



Examine it. See it operate. Try it yourself. Compare it point for point. The Niagara Electro-Pneumatic Clutch is distinctly superior in every respect: hourly output ... ruggedness ... simplicity ... safety ... savings in operation and maintenance. *It's functionally different in every major detail!*

There, in a nutshell, you have one of the principal reasons why Niagara presses continually out-perform all others. For fact-loaded details, as applied to single or double crank inclinable, gap frame, horn and deep throat presses, request specific literature and consult with a Niagara representative.

NIAGARA MACHINE & TOOL WORKS · BUFFALO 11, N. Y.

DISTRICT OFFICES:
Buffalo · Cleveland · Detroit · New York · Philadelphia
Dealers in principal U. S. cities and major foreign countries

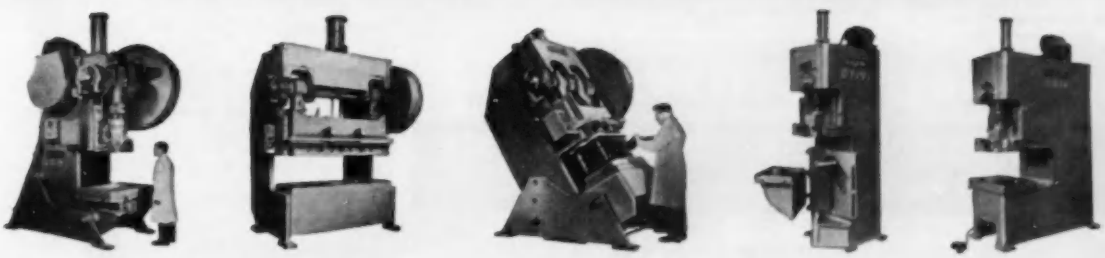
Pneumatic Clutch
greater output, safety and of Niagara Presses

For Better Performance and Safety

- ENGAGES AND DISENGAGES INSTANTLY at any point in the stroke.
- CAN BE SINGLE-STROKED, JOGGED (forward and in reverse) or operated continuously.
- STOPS INSTANTLY by push button, electric eye, limit switch or similar devices — regardless of crank position.
- PROVIDES EFFORTLESS PRESS OPERATION by palm buttons or foot switch.
- FAILS SAFE. Press stops automatically if electric current or air pressure fails.

For Less Maintenance

- NO FRICTION SURFACES to slip, heat up and wear.
- SIMPLE, COMPACT DESIGN. Nothing to adjust.
- LOW INERTIA. Small in diameter. Operates directly on crankshaft, *the slowest rotating shaft*. No gears nor high speed shafts, etc. to start and stop
- LENGTHENS GEAR LIFE. Wear is distributed uniformly, because engagement load is not always applied to same teeth.
- RUNS IN SEALED BATH OF OIL to minimize wear.
- EASILY ACCESSIBLE. Mounted at end of shaft, external to flywheel.
- NO BUCKING of clutch vs. brake.



America's Most Complete Line of Presses, Shears, Machines and Tools for Plate and Sheet Metal Work

More Government Contract Awards

THIS latest list of Government prime contracts that have been awarded covers the period from Aug. 23 to Sept. 27, 1955. Items included in this list are for various types of automotive military equipment, including tanks, motorized gun carriages, trucks, airplanes, automotive components and spare parts, automotive maintenance equipment, etc.

AERO DESIGN AND ENGINEERING CO., Bethany, Oklahoma
Special tools—$306,800

AMERICAN BOSCH ARMA CORP., American Bosch Div., Springfield, Mass.
Repair parts for Diesel engines—24,242 ea.—$46,557

AMERICAN ELECTRONICS, INC., El Monte, Calif.
Air conditioner-trailer mounted and spare parts—186 ea.—$2,889,237.22

BENDIX AVIATION CORP., Bendix Products Div., South Bend, Ind.
Maintenance parts—Various—$929,783
Brake, wheel assys. and maintenance parts for various aircraft—Various—$41,237

BENDIX AVIATION CORP., Scintilla Div., Sidney, New York
Maintenance parts—Various—$25,203

BENDIX AVIATION CORP., Utica Div., Utica, New York
Maintenance parts—Various—$153,731

BORG-WARNER CORP., Pesco Products Div., Bedford, Ohio
Maintenance parts—Various—$34,030
Fuel pumps—348 ea.—$48,310

CATERPILLAR TRACTOR COMPANY, Peoria, Ill.
Spare parts—$157,921

THE CESSNA AIRCRAFT COMPANY, Wichita, Kansas
Research, utility-command aircraft Job study—$56,819

CONTINENTAL MOTORS CORP., Detroit, Mich.
Engine spare parts—99 ea.—$620,532

CURTISS-WRIGHT CORP., Caldwell-Wright Div., Caldwell, New Jersey
Services and material for valves—7000 ea.—$93,310

DOW CHEMICAL COMPANY, Midland, Mich.
Facilities for the production of extrusions —$500,000

FAIRBANKS, MORSE & COMPANY, Fair Lawn, New Jersey
Repair parts for Diesel engines—$151,999

FARGO MOTOR CORP., Washington, D. C.
Trucks—63 ea.—$162,175
Light trucks and spare parts—44 ea.—$111,918
Power wagon express trucks—5 ea.—$10,336

FAYETTE MANUFACTURING COMPANY, Fayette, Ohio
Trailer, cargo, ¼ ton, 2 wheel—406 ea.—$213,150

FORD MOTOR COMPANY, Washington, D. C.
Gasoline motor trucks—19 ea.—$27,293
Automobiles and station wagons—25—$38,225

FORD MOTOR COMPANY, Livonia, Mich.
Truck, stake and platform, 1½ ton—2500 ea.—$3,018,114

FRUEHAUF TRAILER COMPANY, Detroit, Mich.
Auto spare parts—1652 ea.—$222,988

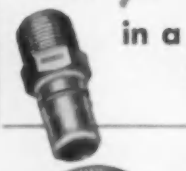
GENERAL DYNAMICS CORP., Convair Div., San Diego, Calif.
CV-340 aircraft, ten, spares, special tools and GHE—$3,394,920

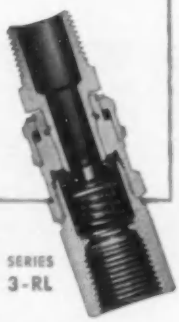
GENERAL MOTORS CORP., Detroit, Mich.
Sedans—20 ea.—$26,846

GENERAL MOTORS CORP., Aeroproducts Div., Dayton, Ohio
Propeller blade assemblies and spare parts—$1,227,600
Kit assemblies for modification of propellers—290 ea.—$25,960

(*Turn to page* 142, *please*)

Everything You Want
in a Quick-Connective Pneumatic Coupling





HANSEN SERIES 3-RL
RING-LOCK COUPLING

On any job requiring ¾" to ⅛" connections—from the air line to the air tool—this single size Hansen Ring-Lock Coupling—with completely interchangeable Sockets and Plugs—does it all—makes it easy to keep stock of parts in balance—holds inventories to a minimum.

To connect, you merely push the Plug into Socket. To disconnect, just turn the sleeve. When Coupling is connected, a locking ring in Socket enters groove in Plug, provides positive lock and insures tight fit. Sockets with aluminum bodies are available for use with small hand-operated air tools.

- Smaller.
- Lighter.
- Effectively handles more volume than any other coupling of equal dimensions.
- Handles any job with fittings from ¾" to ⅛", from the air line to the air tool.
- All Series 3 RL Sockets and Plugs are interchangeable — reduces stock inventory to a minimum.
- One-way shut-off—for pneumatic service applications.
- Positive locking.
- Equipped with automatic sleeve lock.

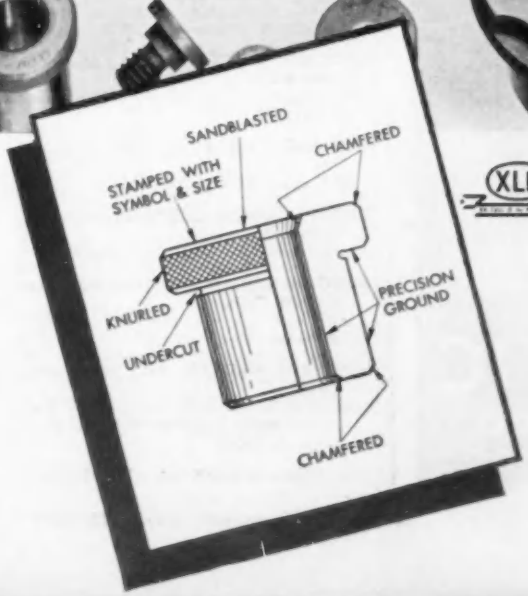
Write for Descriptive Literature

SINCE 1915 — QUICK CONNECTIVE FLUID LINE COUPLINGS
THE HANSEN MANUFACTURING COMPANY
4031 WEST 150th STREET • CLEVELAND 11, OHIO

Look for These Features in Drill Bushings

EX-CELL-O HAS THEM ALL

- **MATERIAL**—High chrome and carbon oil-hardening steel for maximum wear.
- **FINISH**—precision ground inside and out, and under the head for perfect bearing.
- **CONCENTRICITY**—assured by grinding on arbors after the holes are finished.
- **HARDNESS**—Deep-hardened to 62-64 Rockwell "C" in automatic equipment.
- **UNIFORMITY**—of material, dimensions, finish, and hardness assure accuracy, long life for both bushings and tools.
- **PROMPT DELIVERY**—from stocks of standard sizes in Detroit, New York, Los Angeles, and London, Canada.
- **PREFERRED**—largest bushing users in the country are Ex-Cell-O customers.



Your purchasing and engineering departments should have copies of this Ex-Cell-O Bushing Catalog No. 35936. Just ask for the number of copies you would like.

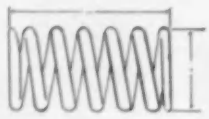
EX-CELL-O CORPORATION

DETROIT 32, MICHIGAN

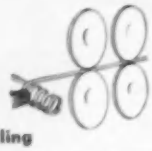
MANUFACTURERS OF PRECISION MACHINE TOOLS • GRINDING SPINDLES
CUTTING TOOLS • RAILROAD PINS AND BUSHINGS • DRILL JIG BUSHINGS
AIRCRAFT AND MISCELLANEOUS PRODUCTION PARTS • DAIRY EQUIPMENT

55-26

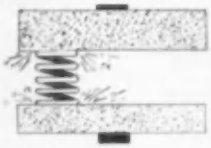
AUTOMATIC SPRING



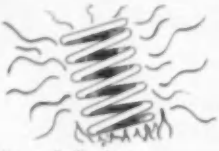
Designing



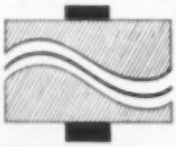
Coiling



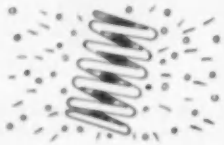
Grinding



Stress Relieving



Forming



Shot Peening

big enough • • • yet small enough

AUTOMATIC SPRING is the ideal size company to make your springs. We're big enough to have a complete range of the best modern equipment. We have a full range of spring coiling machines, a grinding department second to none, stress relieving, shot peening, multi-slide, stamping and finishing facilities, and a complete tool room. And we have the capacity to handle large runs.

But AUTOMATIC SPRING is also small enough to give your job personal attention. Top expert advice is available on your design or engineering problem. From the Production Manager right down to the operator, everyone knows your job and what is wanted. And when you need shipping information, it is available immediately.

So we feel safe in boasting that AUTOMATIC SPRING gives personalized attention. We are big enough—yet small enough!

Send for new illustrated brochure, giving information for specifying springs and other data.

for quality springs "Automatically" think of

AUTOMATIC

SPRING COILING CO.

4058 West Thorndale Ave., Chicago 30, Ill.

(*Continued from page* 140)

GENERAL MOTORS CORP., Allison Div., Indianapolis, Ind.
Kit, bearing output shaft and flange—3028—$28,614
Overhaul and modification of YJ 71-A-2 and YJ 71-A-2A engines—$288,000

GENERAL MOTORS CORP., Chevrolet Motor Div., Detroit, Mich.
Truck, van, 1½ ton—300 ea.—$648,447

GENERAL MOTORS CORP., Cleveland Diesel Engine Div., Cleveland, Ohio
Repair parts for Diesel engines—12,662—$303,524

GENERAL MOTORS CORP., Detroit Diesel Engine Div., Detroit, Mich.
Repair parts for Diesel engines—Various—$170,934

GENERAL MOTORS CORP., Electro-Motive Div., LaGrange, Ill.
Repair parts for Diesel engines—5660 ea.—$51,391

GENERAL MOTORS CORP., GMC Truck & Coach Div., Pontiac, Mich.
Truck, stake and platform, 2½ ton—2500 ea.—$5,660,000
Auto spare parts—12,180 ea.—$116,782

GENERAL MOTORS CORP., United Motors Service Div., Detroit, Mich.
Auto spare parts—6014 ea.—$461,454

THE B. F. GOODRICH COMPANY, Akron, Ohio
Wheel assys.—Various—$72,533

THE GOODYEAR TIRE & RUBBER CO., INC., Akron, Ohio
Wheel and brake assys.—Various—$256,144
Wheel assys.—1526—$89,880
Brake assys.—195 ea.—$48,516

HAMMOND MANUFACTURING CORP., Pasadena, Calif.
Trailer, engine transportation — 300 — $210,000

HARVEY MACHINE COMPANY, INC., Torrance, Calif.
Facilities to establish a pilot line for titanium and steel alloy extrusions—$332,000

LOCKHEED AIRCRAFT CORP., Burbank, Calif.
Special tools and GHE—$269,087
F-104A accelerated production implementation program—$1,000,000

LOCKHEED AIRCRAFT CORP., Marietta, Georgia
Facilities for production of C-130 aircraft—$226,688

McDONNELL AIRCRAFT CORP., St. Louis, Mo.
Tank assys.—80 ea.—$188,144

GLENN L. MARTIN COMPANY, Baltimore, Maryland
Modification kits for aircraft—$40,887

NORTH AMERICAN AVIATION, INC., Los Angeles, Calif.
Long lead time items for sets of F-86K airplanes—56—$7,000,000

NORTHROP AIRCRAFT, INC., Hawthorne, Calif.
Facilities for the development of E-9 fire control system and F-89 flight test program—$930,000

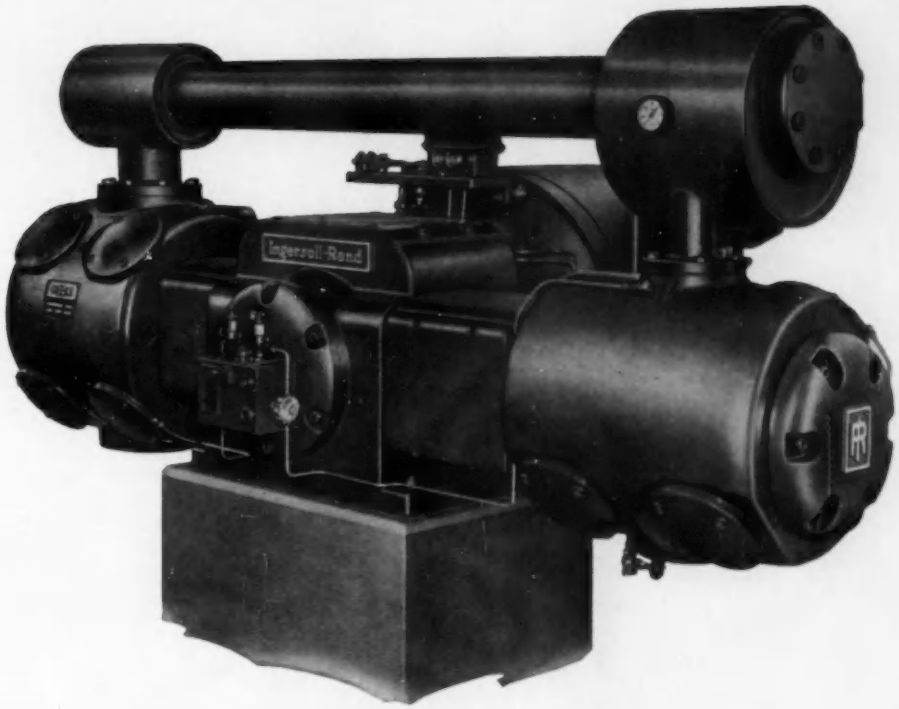
(*Turn to page* 144, *please*)

NEW

OPPOSED-CYLINDER

BALANCED DESIGN, TYPE PHE

COMPRESSOR



COMPACT, SPACE-SAVING PACKAGED DESIGN

The new, space-saving PHE design marks another Ingersoll-Rand achievement in electric-driven compressors. Built for continuous, heavy-duty service, it includes the following outstanding features: Opposed pistons with excellent running balance — Efficient tube-type intercooler—New cylinders with Type A Channel Valves—Motor mounted directly on crankshaft—Full floating aluminum main and crank-pin bearings — Sealed crankcase — Force-feed lubrication.

FOR EASY SHIPMENT, INSTALLATION & RELOCATION

Shipped completely assembled and ready to run, the PHE compressor can be easily installed—in very little floor space—with a minimum of piping—and on a simple inexpensive foundation. Relocation, if required, is equally simple.

ELECTRIC-DRIVEN 75 AND 100 HP SIZES

The basic design is a two-stage unit for 80-125 psi. For other pressures, or for pumping vacuums, alternate cylinder arrangements can be supplied. It will pay you to get all the facts on this new, cost-saving design. Ask for Bulletin No. 3155.

Ingersoll-Rand

1-106 11 Broadway, New York 4, N. Y.

COMPRESSORS • AIR TOOLS • ROCK DRILLS • TURBO BLOWERS • CONDENSERS • CENTRIFUGAL PUMPS • DIESEL AND GAS ENGINES

(*Continued from page* 142)

PARKER AIRCRAFT COMPANY, Los Angeles, Calif.
Valves and manifold assys.—Various—$38,570

SPENCER SAFFORD LOADCRAFT, INC., Augusta, Kans.
Chassis, trailer, generator, 3 ton—231 ea.—$270,989

STEWART STEEL PRODUCTS, INC., Brooklyn, New York
Light trucks and trailers—102 ea.—$16,278

STUDEBAKER-PACKARD CORP., Detroit, Mich.
Repair parts for Diesel engines—49,190 ea.—$755,384

SUNDSTRAND MACHINE TOOL CO., Rockford, Ill.
Manufacture, acquisition and installation of machinery and equipment—$525,000

UNITED AIRCRAFT CORP., Sikorsky Aircraft Div., Bridgeport, Conn.
Kits, spare parts—$385,638

WESTERN ELECTRIC COMPANY, New York, N. Y.
Repair and modification of TM-61 series missiles—$386,784

WESTINGHOUSE ELECTRIC CORP., Aviation Gas Turbine Div., Washington, D. C.
J34WE-36 turbo jet engines—40 ea.—$1,000,000

WILLYS MOTORS, INC., Toledo, Ohio
Jeeps, station wagons and trucks—408 ea.—$674,585
Light trucks—135 ea.—$200,226
Light trucks and spare parts—72 ea.—$137,415

Sales of Motor Vehicles Top 6.3 Million for Eight Months

Reports of sales and production records continue to pour forth from the automobile industry. The Automobile Manufacturers Association has just issued a report which shows that factory vehicle sales for the first eight months soared to an amazing total of 6,348,117 units, an all-time high.

The figure was only 253,000 units shy of the total for the entire year of 1954. It included 5,506,075 passenger cars and 842,042 trucks and coaches.

New Defense Facilities

SUPPLEMENTING the list of Certificates of Necessity issued up to July 27, 1955, authorizing new or expanded defense plant facilities for the manufacture of automotive and aviation war goods which was published in the Sept. 15 issue, page 126 of AUTOMOTIVE INDUSTRIES, the following additional certificates were announced by the Office of Defense Mobilization, covering the period which extends from Aug. 11 to Aug. 24, inclusive.

The figure appearing in parentheses is the percentage authorized in respect to actual fast tax write-offs.

ASSOCIATED SPRING CORP., Bristol, Conn.
Cold rolled spring steel for military items—$842,285 (50)

THE FIRESTONE TIRE & RUBBER CO., Los Angeles, Calif.
Ordnance parts—$2,567,267 (40)

GENERAL ANILINE AND FILM CORP., Rensselaer, New York
Plastic products for military aircraft—$286,900 (65)

HOLLEY CARBURETOR CO., Warren Township, Mich.
Military jet engine controls—$2,110,820 (45)

LOCKHEED AIRCRAFT CORP., Burbank, Calif.
Military aircraft—$90,400 (60)

LOCKHEED AIRCRAFT CORP., Missile Systems Div., Van Nuys, Calif.
Research and development — $278,912 (65)

THE GLENN L. MARTIN CO., Middle River, Maryland
Military aircraft—$1,498,000 (80)

UNITED STATES STEEL CORP., Oliver Iron Mining Div., Mountain Iron, Minn.
Taconite pelletizing facilities—$1,560,000 (75)

Hardened and Ground Parts are our *Specialty*

This king pin is truly king-size: 8" long and weighs about 12 lbs. We machined it out of No. 3140-2⅞" bar steel. After heat treating, bearing surface was given the specified fine finish-grind to 2½" dia., +.000 −.001.

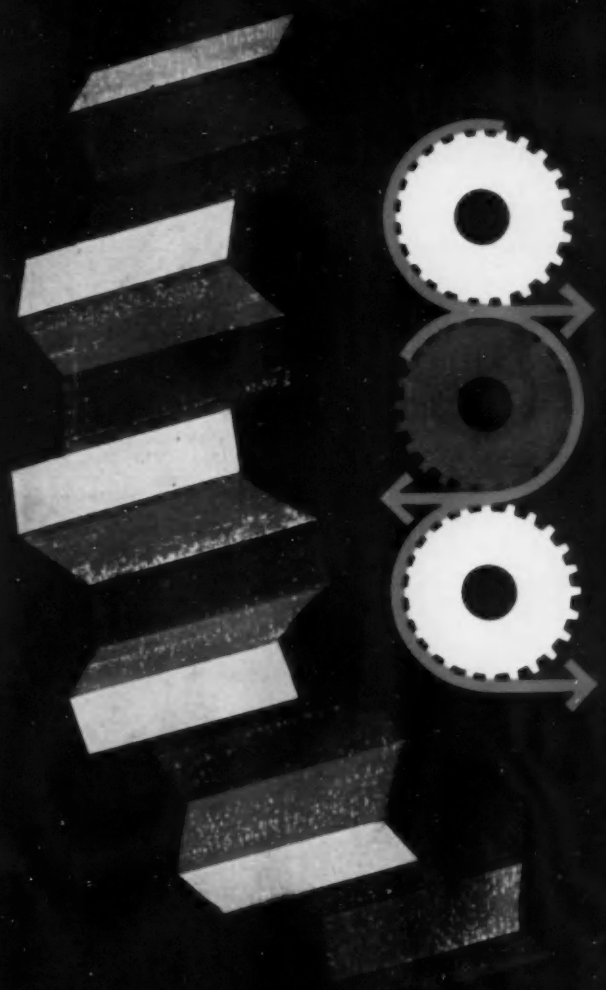
Parts like this are our specialty—we've been making them exclusively for the automobile industry for more than 40 years. Each year has added to our knowledge and skill in precise machining, scientifically-controlled heat treating and micro-finish grinding. Let us show you what we can do with one of your tough jobs. Write or wire.

Harry W. Brown
PRESIDENT

Experienced production on:
King Pins • Wheel Studs
Shackle Bolts • Shackle Pins
Brake Anchor Bolts
Countershafts • Idler Shafts
Stub Axle Shafts
Steering Ball Bolts
5th-Wheel Rocker Shafts
Water Pump Shafts
. . . anything in the hardened and ground line, of any analysis steel, up to 4¼" diameter.

THE BROWN CORP.
213 BELLEVUE AVE. SYRACUSE, N. Y.
C. H. Ehlert, 3407 Clarendon Rd., Cleveland • H. P. Spring, 4716 Balfour Rd., Detroit • R. C. Sanderson, 6661 N. Ashland Ave., Chicago • Harry J. Wiedmaier, 1704 Carlton, Fort Worth • Lyle H. Johnson, 1350 Westwood Blvd., Los Angeles, Calif. • John G. Hunt, 5811 S.E. Yamhill St., Portland, Ore.

4150 steel is your best bet for heavy sections



Chromium Molybdenum Steel like AISI-SAE 4150 is the most economical way to uniform properties throughout heavy sections. For heavy duty gears — for shafts — wherever toughness and fatigue strength are important, *plentiful* 4100 Moly steels are better. We will prove it. Climax Molybdenum Company, 500 Fifth Ave., New York 36, N. Y.

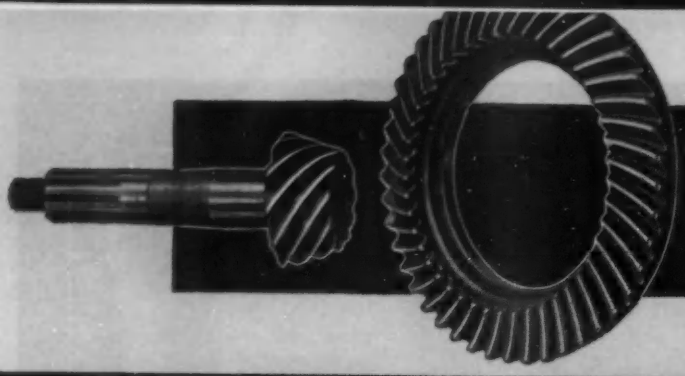
AISI-SAE 4150

C	Mn	Pmax	Smax
0.48/0.53	0.75/1.00	0.040	0.040
Si	**Cr**	**Mo**	
0.20/0.35	0.80/1.10	0.15/0.25	

4100 steels are your best bet

CLIMAX MOLYBDENUM

MS3-13



OVER ONE

QUIET Spicer AXLES

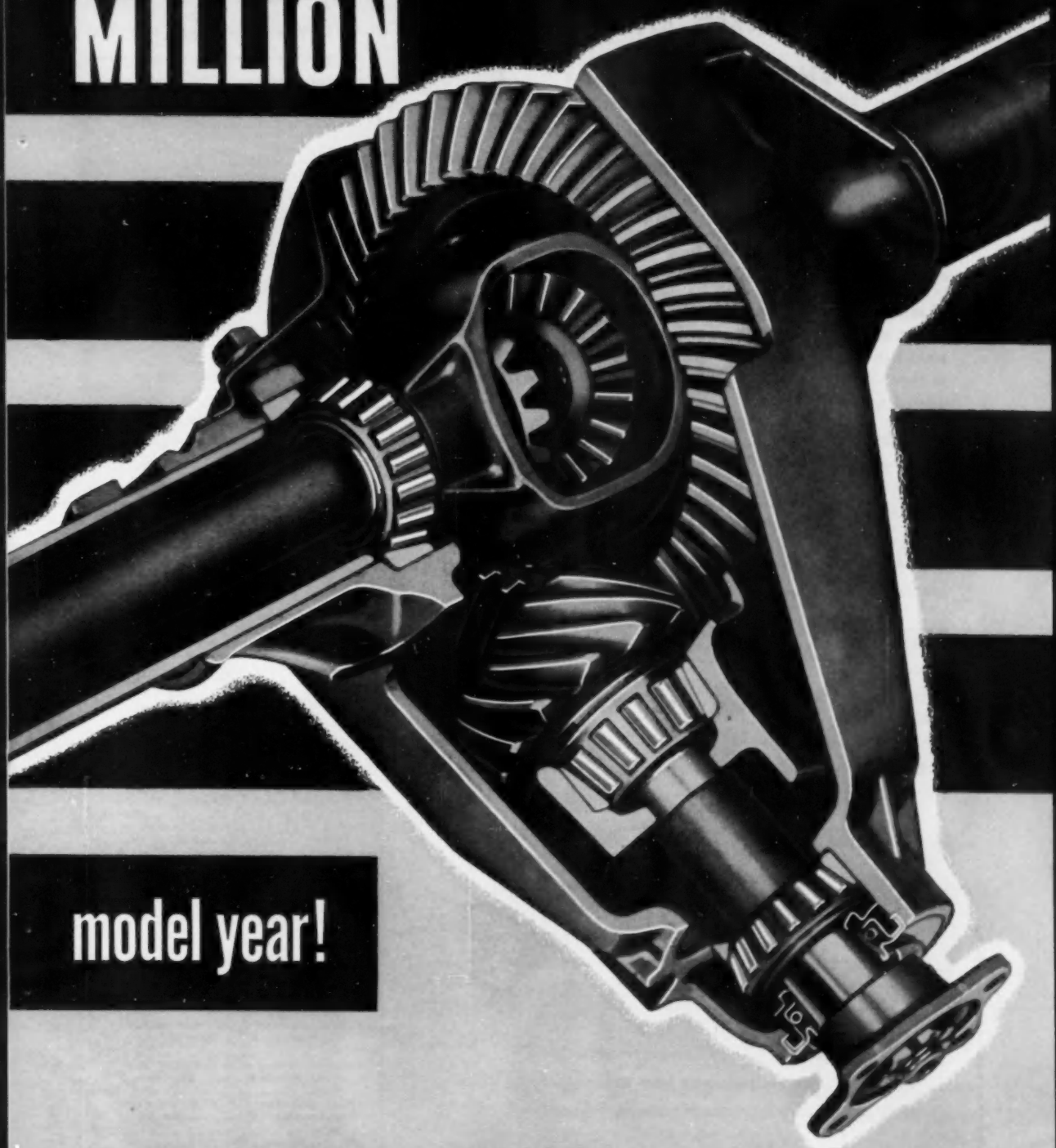
for passenger car and light commercial use

produced during the

1955

Spicer

MILLION



model year!

DANA CORPORATION • TOLEDO 1, OHIO

SPICER PRODUCTS: TRANSMISSIONS • UNIVERSAL JOINTS • PROPELLER SHAFTS • AXLES • TORQUE CONVERTERS • GEAR BOXES • POWER TAKE-OFFS • POWER TAKE-OFF JOINTS • RAIL CAR DRIVES • RAILWAY GENERATOR DRIVES • STAMPINGS • SPICER and AUBURN CLUTCHES • PARISH FRAMES

DO YOU NEED ANSWERS TO THESE QUESTIONS?

1 How can I electroclean steel at lower cost?

2 How can I find a brass cleaner that gives better protection against tarnishing?

3 How can I reduce rejects due to faulty electrocleaning of zinc die castings?

***Answer* 1** Following an Oakite recommendation, one plater made a small change in his steel-cleaning cycle and soon had two tankfuls of cleaning solution doing the work of three—and the plate adhesion was improved. *See booklet offered below.*

***Answer* 2** Oakite has a new brass cleaner that provides scientific protection against the oxygen that tarnishes brass and other copper alloys during the application of reverse current. *See booklet offered below.*

***Answer* 3** Oakite has an anodic conditioner that offers brighter plating of zinc die castings . . . with no anodic blackening and fewer rejects. *See booklet offered below.*

FREE For more information about the electrocleaning of steel, brass or zinc die castings, ask for one or all of the booklets listed in the coupon.

four good steps toward better electroplating on steel
NEW
Good news about electrocleaning zinc-base die castings
OAKITE

Technical Service Representatives in Principal Cities of U. S. and Canada

OAKITE PRODUCTS, INC.
28A Rector Street, New York 6, N. Y.

Send me the free booklets I have checked below:

☐ "Four good steps toward better electroplating on steel"

☐ "What's NEW for electrocleaning brass and other copper alloys"

☐ "Good news about electrocleaning zinc-base die castings"

Name .....

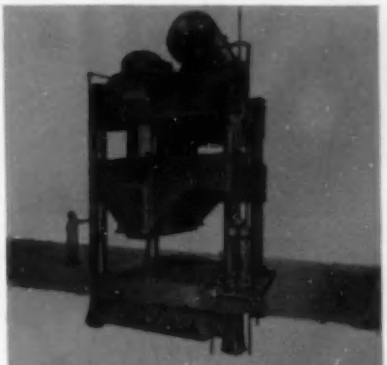
Company .....

Address .....

CALENDAR

OF COMING SHOWS AND MEETINGS

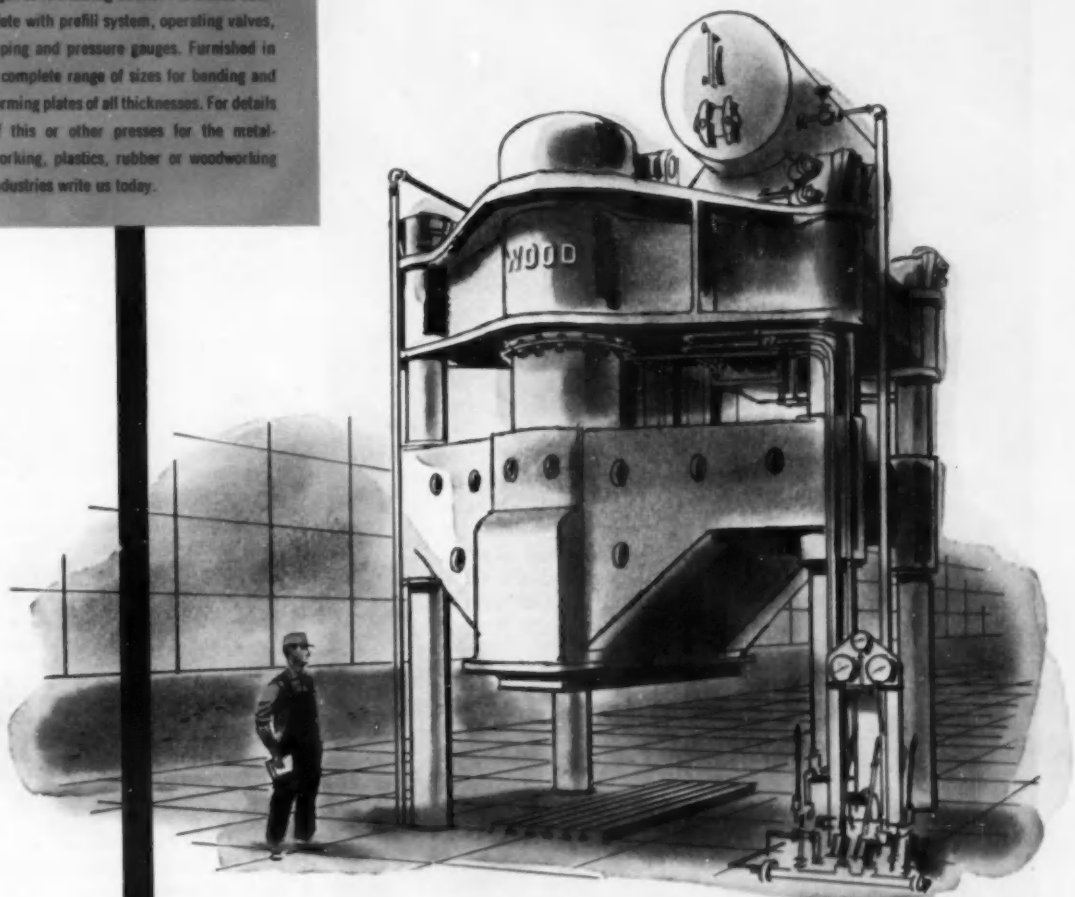
National Metal Exposition, Convention Hall, Philadelphia, Pa..Oct. 17-21
National Safety Congress and Exposition, Chicago, Ill. .....Oct. 17-21
Gray Iron Founders Society, annual meeting, Schroeder Hotel, Milwaukee, Wis. .....Oct. 19-21
International Motor Show, Earls Court, London, England...Oct. 19-29
AGMA Semi-annual Meeting, Edgewater Beach Hotel, Chicago, Ill. Oct. 23-26
ASA Conference on Standards, Sheraton-Park Hotel, Washington, D. C. .....Oct. 24-26
Canadian Industrial Tool and Equipment Show, Montreal, Canada .....Oct. 24-28
AIEE Aircraft Conference, Hollywood Roosevelt Hotel, Los Angeles, Calif. .....Oct. 25-27
ASME-IME Joint Conference on Combustion, London, England Oct. 25-27
ASBE Annual Technical Convention, Detroit, Mich. .....Oct. 26-28
NICB Conference on Atomic Energy in Industry, Waldof-Astoria Hotel, New York, N. Y.....Oct. 26-28
National Conference on Industrial Hydraulics, La Salle Hotel, Chicago, Ill. .....Oct. 27-28
Automobile Old Timers, 16th anniversary dinner Waldorf-Astoria Hotel, New York, N. Y..Oct. 28
ANA Annual Meeting, Hotel Plaza, New York, N. Y.....Oct. 31-Nov. 2
SAE Golden Anniversary National Transportation Meeting, Hotel Chase, St. Louis, Mo. .,Oct. 31-Nov. 2
National Lubricating Grease Institute, annual meeting, Edgewater Beach Hotel, Chicago, Ill. .....Oct. 31-Nov. 2
Fifth Transport Aircraft Hydraulic Conference, Park Shelton Hotel, Detroit, Mich. .....Nov. 2-3
National Fluid Power Association, Fall meeting, Edgewater Beach Hotel, Chicago, Ill. .....Nov. 2-4
SAE Golden Anniversary National Diesel Engine Meeting, Hotel Chase, St. Louis, Mo. .....Nov. 2-4
Institute of Aeronautical Sciences and Canadian Aeronautical Institute, joint meeting, Ottawa, Canada .....Nov. 3-4
National Tool and Die Manufacturers Association Convention, Statler Hotel, Detroit, Mich..Nov. 3-6
SAE Golden Anniversary Fuels and Lubricants Meeting, Bellevue-Stratford Hotel, Philadelphia, Pa. .....Nov. 9-10
ASME Diamond Jubilee Annual Meeting, Congress, Conrad Hilton, and Sheraton-Blackstone Hotels, Chicago, Ill. .....Nov. 13-18
Second International Automation Exposition, Navy Pier, Chicago, Ill. .....Nov. 14-17
American Petroleum Institute, annual meeting, San Francisco, Calif. .....Nov. 14-17
ASQC Mid-West Conference, Schroeder Hotel, Milwaukee, Wis. .....Nov. 17-18
Air Conditioning & Refrigeration Industry Exposition, Auditorium, Atlantic City, N. J. Nov. 28-Dec. 1
SPI Film, Sheeting, and Coated Fabrics Div. Conference, Hotel Commodore, New York, N. Y..Dec. 6-7



1500-ton Heavy-Duty Forming Press for bending and forming operations on heavy steel plate. Moving platen can be tilted right or left during stroke. Furnished complete with prefill system, operating valves, piping and pressure gauges. Furnished in a complete range of sizes for bending and forming plates of all thicknesses. For details of this or other presses for the metal-working, plastics, rubber or woodworking industries write us today.

You'll like what it does to production

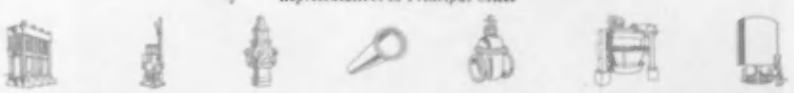
It's just plain common sense—when your down-time decreases your production is bound to increase. Down-time can't be eliminated, but R. D. Wood presses hold it to a minimum. The meticulous design, choice materials and careful craftsmanship that go into a Wood press produce a superior product—a dependable, smooth-working press that can't help but increase production records. Products with the Wood stamp of quality have been piling up production records for more than 150 years.



R. D. WOOD COMPANY

PUBLIC LEDGER BUILDING • PHILADELPHIA 5, PENNSYLVANIA

Representatives in Principal Cities



MAKERS OF HYDRAULIC PRESSES AND VALVES • FIRE HYDRANTS • CAST-IRON PIPE • GATE VALVES • GAS PRODUCERS • ACCUMULATORS

MEN *in the* NEWS

(*Continued from page* 41)

Brush Electronics Co.—Darius R. Barber has been named controller.

General Ceramics Corp.—**John H. Bouwmeester** has been named vice-president of manufacturing.

Minnesota Mining & Mfg. Co., Reinforced Plastics Div.—**Bertrand Y. Auger** is now technical director.

Thompson Products, Inc.—**John B. Gates** has been named manager of the Bell Los Angeles plant.

E. W. Bliss Co.—**Jack E. Garnhart** was made Chicago district sales manager.

Dodge Div., Chrysler Corp.—Lee F. Desmond has been made vice-president, and Byron J. Nichols has been promoted to vice-president and general sales manager.

Joseph T. Ryerson & Son, Inc.—**Robert A. Daggit** is now assistant manager of sales for the Chicago plant.

Ford Motor Co.—**F. O. Fason** has been appointed production manager at the Buffalo assembly plant.

Punch Products Corp.—**Jerome F. Ferdinand** is now sales manager.

Northrop Aircraft, Inc.—**Lee H. Smith** has been named director of military relations and customer service.

Ball Brothers Co.—**R. Arthur Gaiser** was made director of research and product development.

Le Roi Co.—**Allen Bartlett** has retired as coordinating engineer.

General Tire & Rubber Co., Textileather Div.—**D. A. Davis** has been promoted to purchasing agent.

Howe Scale Co., Inc., Truck Div.—**Philip C. Cook** was made sales manager.

Consolidated Engineering Corp., Transducer Div.—**Kennett W. Patrick** is now director.

Joseph T. Ryerson & Son, Inc.—**Henry B. Williams** has been made manager of sales for the New York area steel service plant.

Ethyl Corp., Product Development Div.—**Julian M. Avery** has been named director.

Steel Products Engineering Co.—**William R. Alexander** has been appointed director of engineering.

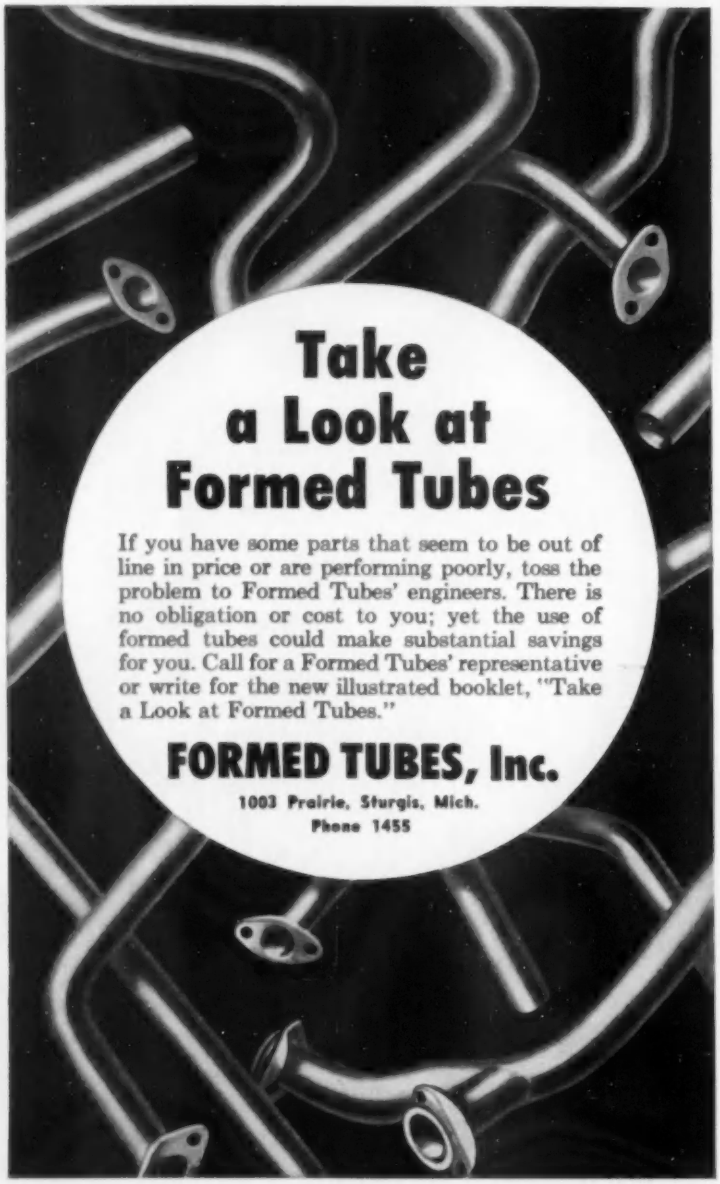
Clark Equipment Co., Industrial Truck Div.—**B. E. Phillips** has become assistant sales manager.

Chrysler Corp.—**Robert C. Somerville** has been appointed executive director of markets.

Raytheon Manufacturing Co.—**Nathaniel B. Nichols** has been made manager of commercial equipment engineering activities.

Wagner Electric Corp., Automotive Div.—**G. W. Hill** was made automotive branch supervisor.

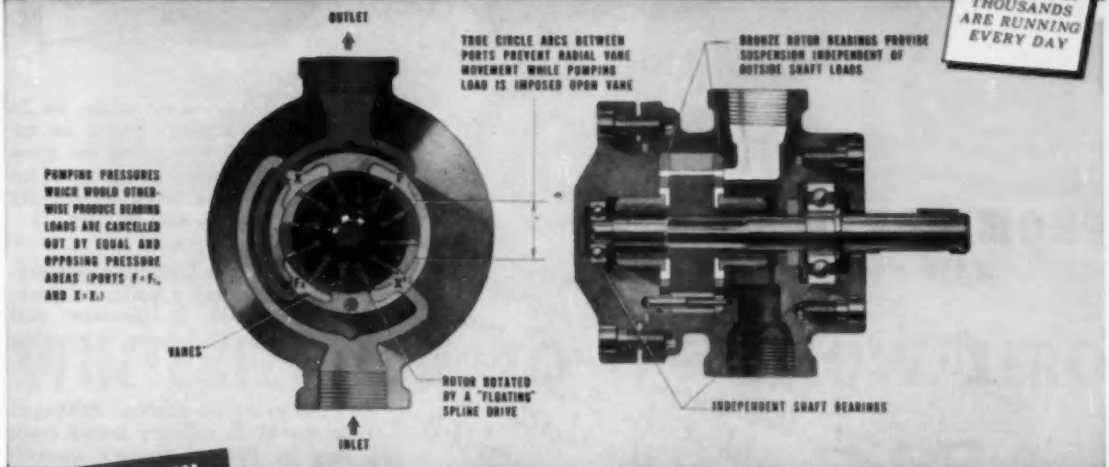
(*Turn to page* 182, *please*)


Take
a Look at
Formed Tubes
If you have some parts that seem to be out of line in price or are performing poorly, toss the problem to Formed Tubes' engineers. There is no obligation or cost to you; yet the use of formed tubes could make substantial savings for you. Call for a Formed Tubes' representative or write for the new illustrated booklet, "Take a Look at Formed Tubes."
FORMED TUBES, Inc.
1003 Prairie, Sturgis, Mich.
Phone 1455

Question:

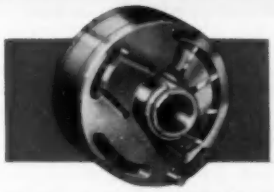
Why are VICKERS Balanced Vane Type Pumps the most widely used oil hydraulic power pumps?

HUNDREDS OF THOUSANDS ARE RUNNING EVERY DAY


OUTLET
TRUE CIRCLE ARCS BETWEEN PORTS PREVENT RADIAL VANE MOVEMENT WHILE PUMPING LOAD IS IMPOSED UPON VANE
BRONZE ROTOR BEARINGS PROVIDE SUSPENSION INDEPENDENT OF OUTSIDE SHAFT LOADS
PUMPING PRESSURES WHICH WOULD OTHERWISE PRODUCE BEARING LOADS ARE CANCELLED OUT BY EQUAL AND OPPOSING PRESSURE AREAS (PORTS F-F, AND X-X)
VANES
ROTOR ROTATED BY A "FLOATING" SPLINE DRIVE
INDEPENDENT SHAFT BEARINGS
INLET

Answer:

Because of their SUPERIOR PERFORMANCE and MANY OTHER BENEFITS for the user.



For more than two decades, the Vickers Balanced Vane Type has held the leading position among hydraulic power pumps . . . growing steadily in popularity. The various models (see below) are *the most widely used of all pumps in oil hydraulic service.*

Above is the pumping cartridge which is one of this pump's distinctive features. The many advantages listed at the right merit the thoughtful attention of anyone concerned with the selection and use of oil hydraulic pumps.

VICKERS INCORPORATED

DIVISION OF SPERRY RAND CORPORATION

1428 OAKMAN BLVD. • DETROIT 32, MICH.

Application Engineering Offices • ATLANTA • CHICAGO CINCINNATI • CLEVELAND • DETROIT • HOUSTON LOS ANGELES AREA (El Segundo) • MINNEAPOLIS NEW YORK AREA (Summit, N. J.) • PHILADELPHIA AREA (Media) • PITTSBURGH AREA (Mt. Lebanon) PORTLAND, ORE. • ROCHESTER • ROCKFORD • SAN FRANCISCO AREA (Berkeley) • SEATTLE • ST. LOUIS TULSA • WASHINGTON • WORCESTER

IN CANADA: Vickers-Sperry of Canada, Ltd., Toronto

COMPLETE HYDRAULIC BALANCE—Each inlet and outlet port is balanced by another equal in size and radially opposite . . . pressure-induced bearing loads are thus eliminated. Pressure-balanced porting plates maintain ideal running clearances.

FLOATING SPLINE DRIVE—Rotor is driven by a "floating" spline. Rotor and shaft have separate bearings . . . avoiding strain from drive misalignment.

TRUE-CIRCLE CAM ARCS between ports prevent radial vane movement while pumping load is imposed upon vanes. Wear between vanes and rotor is thus practically eliminated.

ABILITY TO TOLERATE DIRT—Clean oil is of great importance in a hydraulic circuit; but, in spite of care, dirt sometimes gets in. The Vickers Vane Type Pump will pass a reasonable amount of dirt without trouble and without grinding it up.

REPLACEABLE CARTRIDGE—Cartridge (illustrated above left) contains all pumping parts that move . . . none contact the housing. Working parts can be removed and inspected without disconnecting piping or drive coupling. Replacement cartridge kits are available and pumps need not be sent to the factory for repairs. Pump capacity can be changed by simply changing cartridge in the field.

HIGHER EFFICIENCY—Tests prove exceptionally high volumetric and overall efficiency . . . not only when pump is new but also after long service.

AUTOMATIC WEAR COMPENSATION—Vanes are held in contact with the cam ring by centrifugal force and hydraulic pressure. If wear occurs, vanes revolve in a slightly larger orbit without appreciable change in performance.

MINIMUM MAINTENANCE—Hydraulic balance . . . floating spline drive . . . independent bearings . . . automatic wear compensation eliminate the most important causes for maintenance and repair.

TEMPERATURE ADAPTABILITY—Correct running clearances are automatically maintained which compensate for wide variation in oil viscosity resulting from temperature variation.

LONGER LIFE—The numerous features mentioned above that keep down maintenance also contribute to longer life. Then, a new cartridge completely rejuvenates the pump.

CONSTRUCTION SIMPLICITY is evident from the illustrations above. This simplicity is another reason for the superiority of Vickers Vane Pumps. For further information, ask for Bulletin 7182

ALL MODELS HAVE THE VICKERS ADVANTAGES MENTIONED ABOVE

Single Stage. Pressures to 1,000 psi. Capacities to 55 gpm.

Two Stage. Pressures to 2,000 psi. Capacities to 55 gpm.

Double Pump—Two pumps for separate circuits driven by common shaft.

Two-Pressure Pump automatically delivers larger volume at low pressure and smaller volume at high pressure.

FROM NORTH POLE...

Note to ad manager:
← Picture isn't appropriate!
Don't you know it's just as
cold at the South Pole as
it is at the North Pole?
H.A.C

NOTE TO BOSS! Sure!
but who wants to look
at Eskimos all the time?
H.P.B

TO SOUTH POLE...

IT'S

STACKPOLE

BETTER BRUSHES... for all rotating electrical equipment . . . automotive, aviation, traction and industrial.

DEPENDABLE CONTACTS... Carbon, graphite, metal powder and precious metal types specifically "tailored" to your equipment and operating conditions.

...And dozens of carbon, graphite and metal powder specialties.

STACKPOLE CARBON COMPANY, *St. Marys, Pa.*

SHORTIES

In intercity travel alone, trucks moved the nation's goods an unprecedented 184 billion ton-miles in 1953 and were in operation an average of 58 days a year for each family in the country.

•

In 1925, it took 24 minutes working time to buy a gallon of gasoline; in 1935, 21 minutes; and today, only 10 minutes of working time.

•

For every jet airplane delivered to the U. S. military forces each day in 1949, America's aircraft industry is delivering five today.

•

The 1000th jet bomber produced by a major U. S. manufacturer required only seven per cent of the manhours needed to complete the first production bomber.

•

An oil filter will remove a pound or more of dirt and sludge from the oil in a car during 5000 miles of driving.

•

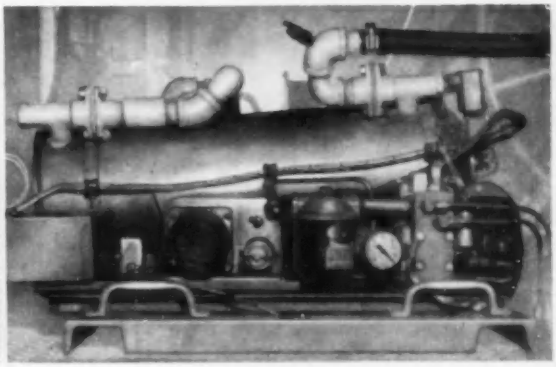
A compressor used in one car air conditioning system is no larger than a football, yet it has the capacity to produce cooling equal to that of 24 household refrigerators.

•

If one year's production of Diesel fuel injectors made by one manufacturer were operated in engines continuously for one year they would inject more than 5.5 billion gal of fuel oil. During this time, the engines would develop approximately 77.5 billion hp. If this energy could be stored in a car and used to drive it at 60 mph, it would travel around the world 2,058 million times, and it would require 97,900 years.

•

If a car gets the average mileage of 15 mpg, it could drive around the world more than 2770 times on the gasoline that one particular storage tank holds.



TYPE 0-6 CRASH TRUCK plus JANITROL LIQUID HEATER equals

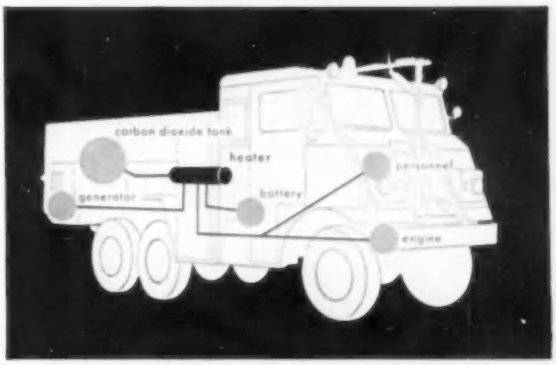
WINTERIZATION TO 65° BELOW ZERO

It takes just fifteen minutes for two men to install and connect, or disconnect and remove the Janitrol Liquid Heater equipped "winterization kit" in the Air Forces new Type 0-6 Cardox Crash Truck.

Cardox engineers took full advantage of Janitrol unit design accessibility . . . added a coolant pump, hand bypass pump, electrical over-ride connections, and an aluminum channel-iron skid base to come up with the ultimate in changeover speed. Just six quick-disconnect couplings tie coolant flow—electric supply—and fuel supply to the permanently installed winterization system within the truck. Operating controls are installed in the truck cab.

The Janitrol heater provides 90,000 Btu/hr for engine block, engine pan, battery box, radiator, cab and body, defrosting, a motor generator set, and the Cardox pressure vessel heating. Complete insurance against winter operating failures caused by freeze-ups!

Look into Janitrol Liquid Heaters' long record of dependability under all conditions—and you'll specify "Janitrol" for vehicle heat wherever and whenever needed.



HEAT WHEREVER YOU WANT IT

Janitrol

AIRCRAFT-AUTOMOTIVE DIVISION, SURFACE COMBUSTION CORP., COLUMBUS 16, OHIO

District Engineering Offices: New York, 225 Broadway; Washington, D. C., 4650 East-West Highway; Philadelphia, Penna., 401 No. Broad St.; Kansas City, Mo., 2201 Grand Ave.; Fort Worth, 2509 Berry St.; Hollywood, Calif., 7046 Hollywood Blvd.; Columbus, Ohio, 400 Dublin Ave.

WEAN EQUIPMENT CORPORATION
22800 LAKELAND BOULEVARD
CLEVELAND-17-OHIO

REPLY TO
22800 LAKELAND BLVD
CLEVELAND 17, OHIO

WARREN OFFICE
347 N. PARK AVENUE
WARREN, OHIO

A letter of interest to Every Press User!

Dear Sir:

During the last year our company has developed a new press of revolutionary design.

We have conducted a series of tests on this machine which has been witnessed by a large group of press experts.

The net impression of these people seems to indicate that our development may preface sweeping changes in the whole field of metal stamping.

It was our original intention to restrict the application of this press to certain specialized industrial fields, but it is now apparent that it has the broadest possible application and the pressure to release general information regarding its performance has been overwhelming.

We, therefore, use this open letter as an invitation to authorized personnel to see this machine in operation.

If you will express your desire in letter form on company stationery, it will receive our prompt attention.

Very truly yours,

WEAN EQUIPMENT CORPORATION

R. J. Wean, Jr.

R. J. Wean, Jr.
President

Wean

FLYING PRESS

Designed primarily for speed of operation, the Wean Flying Press is the first machine of its kind to successfully combine the fast operating advantages of continuously fed strip with dies which move with the strip.

The press differs greatly from conventional machines. Machine tool-like in appearance, it has a minimum of vibration and requires no foundation. In addition to its great speed, it incorporates several new design principles that should interest every press user.

An automatic adjustment of feed length while press is in motion, and the absence of a clutch and brake (the most frequent points of maintenance on conventional presses), are two examples of this advanced engineering.

Wean 60-ton Flying Press stamping out automotive hinge plates at 600 pieces-per-minute, using the same die set which on a conventional press made the parts at a rate of but 90 pieces-per-minute.

Wean EQUIPMENT CORPORATION Cleveland, Ohio

Chicago Newark, N. J. Detroit

Best for keeping inventories low because . . .

UNITED AIR LINES can guarantee Reserved Air Freight space

No longer do you have to maintain high-level, costly inventories at widespread points to meet distribution or production-line needs. United Air Lines – and only United – can provide guaranteed Reserved Air Freight space on *all* equipment, not only over its own routes, but worldwide through connecting airline agreements.

This modern, dependable way of shipping enables you to keep a tighter inventory control, reduce warehousing costs and eliminate production-line delays. It brings new economy and efficiency to practically every type of business.

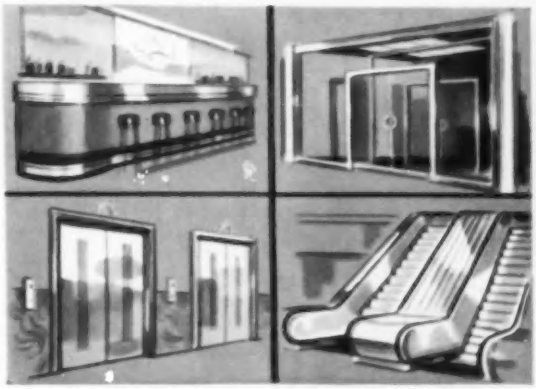
United's Main Line Airway follows the bustling business belt across the nation. There are more than 254 Mainliner® flights daily, each carrying cargo, most offering Reserved Air Freight space. Whatever your business, whatever you ship, it will pay you to use United Air Lines Air Freight.

For speed, dependability and economy, learn the advantages of United Air Lines Air Freight Service. Call the nearest United representative or write for free booklet, "Industry's Flying Partner." Cargo Sales Dept. I-10, United Air Lines, 5959 S. Cicero Avenue, Chicago.

modern design specifies stainless steel

The new 42-story Socony Mobil Building, world's largest metal-clad building now under construction in New York City, will have a "skin" of 7,000 stainless steel panels. The architects and builders specified stainless for its enduring beauty, resistance to corrosion and ease of maintenance.

McLouth
STAINLESS
Steel
for buildings



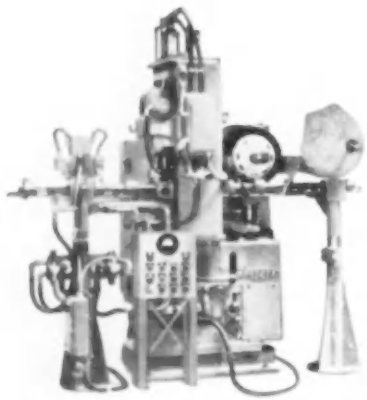
In fixtures, trim, curtain walls and hundreds of other applications you will profit by using McLouth Stainless Steel.

For the product you make today and the product you plan for tomorrow specify McLouth high quality sheet and strip Stainless Steel.

McLouth Steel Corporation
Detroit, Michigan

MANUFACTURERS OF STAINLESS AND CARBON STEELS

BRUSHAMATION BY OSBORN



AUTOMATED BRUSHAMATIC®... One of Osborn's integrated production line automatic power brushing machines.

The parts shown above are typical of the work you can now handle with Osborn's line-production power brushing method... ***BRUSHAMATION.***

COMPLETELY INTEGRATED...Osborn's Automated Brushamatic® Equipment fits right into your production line.

ELIMINATES BOTTLENECKS. It is now possible to remove burrs, blend surface junctures, remove weld scale, clean parts on a continuous line-production basis.

AUTOMATES FINISHING OPERATIONS... takes parts right from your production lines, feeds them to rotating power brushes, delivers them precision-finished to micro-tolerances where necessary

... all without manual handling.

Qualified engineers will show how you can benefit with automated brushing at the Osborn Booth 718, The Metal Show, Philadelphia, Oct. 17-21. If you can't make the show, write us for complete information. *The Osborn Manufacturing Company, Dept. E-34, 5401 Hamilton Avenue, Cleveland 14, Ohio.*

Osborn Brushes

© 1955 The Osborn Manufacturing Company

OSBORN

BRUSHING METHODS • POWER, PAINT AND MAINTENANCE BRUSHES
BRUSHING MACHINES • FOUNDRY MOLDING MACHINES

40th YEAR NEWS

PARKER RUST PROOF COMPANY

PUBLISHED BY PARKER RUST PROOF COMPANY FOR THE METALWORKING INDUSTRY

On this, our Fortieth Anniversary, our humble and grateful thanks to those we have been privileged to serve during two World Wars, the Great Depression and now our period of greatest prosperity.

Parker Rust Proof Company,
R. W. Englehart, President

A LIST OF "FIRSTS" BY PARKER RUST PROOF

1. First commercial phosphate rust-proofing process (1915).
2. First high speed production phosphate rust-proofing process.
3. First process for spray application of phosphate coating materials.
4. First steel mill application for phosphate coating galvanized sheets.
5. First phosphate coating of ordnance items.
6. First substitute for tin in tin cans.
7. First phosphate coating process for wear resistance on machined elements.
8. First process for cold drawing seamless and welded carbon steel tubes.
9. First process for cold drawing stainless steel.
10. First process for cold extrusion of metal.
11. First process for treatment of metal to permit elimination of ground coat in porcelain enameling of metal (1955).

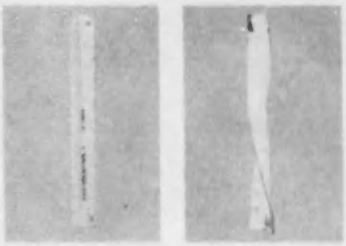
BIRTHDAY TWINS: NEW PRETREATMENT FOR PORCELAIN ENAMEL; BONDERITE WITH ICRA

Two new Parker products have been announced within a few months of the company's 40th Anniversary. One is a revolutionary new approach to porcelain enameling on ferrous metals, the other is a refinement in phosphate coating to produce more durable, more attractive paint finishes.

Parker Pre-Namel 410

This new Parker product, a pretreatment used to prepare ferrous metals for porcelain enameling, eliminates the need for a ground coat, makes it unnecessary to use premium alloys, permits application of finish coat directly on the metal.

One-coat porcelain enameling over Parker Pre-Namel 410 is simpler and more economical to produce. Durability of the finish is improved, too, as shown by standard ASTM and PEI tests. Rejects and parts for re-operation are reduced to a degree never before possible. 98% acceptance has been attained in production test runs. Plant men familiar with the product estimate that economies through Parker Pre-Namel 410 will amount to from 1 to 3 cents per square foot of enameled surface.



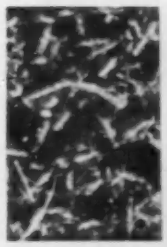
Left: Conventional two-coat porcelain enamel on enameling iron angle failed when twisted 70°. (Metal, twisted less than its elastic limit, returned to original shape.)

Right: Finish coat only, over Parker Pre-Namel 410 on enameling iron angle, withstood 240° twist before failure.

Parker Pre-Namel has been thoroughly tested for two years. It is ready now for use in production applications on the various types of articles finished with porcelain enamel.

New Bonderite Has Built-In Crystal Refining Agent

Series 800 Bonderites contain ICRA (Internal Crystal Refining Agent). This new built-in control produces a denser, finer, more uniform crystalline structure which results in improved paint adhesion and greater luster and reflectiveness.



Photomicrograph, 100X, of steel panel after phosphate treatment without ICRA. Note large crystals.

Photomicrograph, 100X, of steel panel after treatment with Bonderite with ICRA. Note fine, dense crystals.

This new series of Bonderites has the simplicity of operation and control, the uniformity of results and the over-all economy that characterizes all Parker products.

There's a formulation to meet almost every requirement of material to be treated, type of equipment and operating speed.

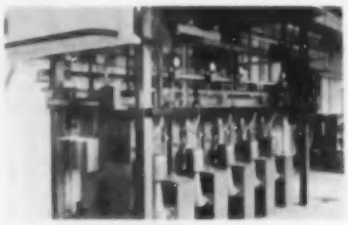
AUTOMATION IN FINISH SYSTEMS IN 1928

Automatic handling of materials through a series of operations—"automation"—is new in name only to Parker. Among the contributions of this company to the metalworking industry has been the development of straight line production, without intermediate handling, of parts through cleaning, metal preparation, dry-off and painting.

Parker's engineering department, working with conveyor and equipment companies, pioneered the first continuous dip-treatment installation in 1928, in which wheel rims were carried through cleaner, rinse and Parco Compound tanks by conveyor.

When faster-acting Bonderites were developed by Parker research, spray equipment was designed to accomodate the higher production speeds it made possible. The reduced costs and higher uniform quality, that comes with automatic operation, were made available to users of Parker Products years ahead of other automatic processing.

"GOLD STANDARD" IN PANELS FOR PAINT TESTS



This automatic machine treats panels with Bonderite on a production basis to meet the demands of Parker customers.

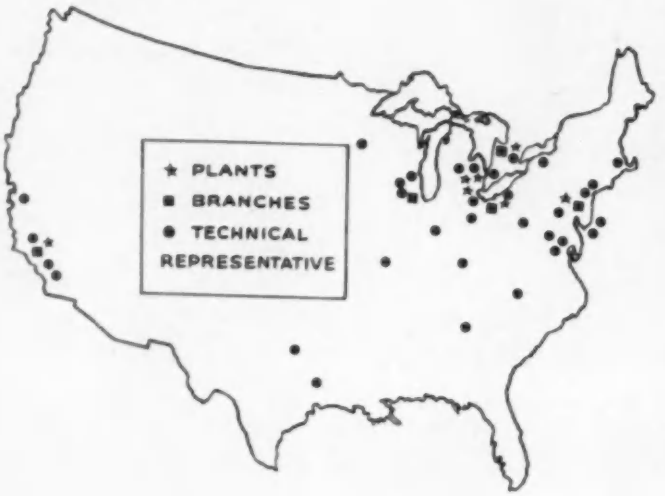
The Bonderite-treated panels prepared in Parker's service laboratories are the Gold Standard used in testing paint performance. To evaluate new paints and maintain quality control on production, manufacturers will use over one half million of these Bonderite-treated panels this year. When you use Bonderite in your plant, you are using the recognized leader in the field.

New Products, New Methods Come from Parker's Research Laboratories

There has been a research department at Parker for as long as there has been a company. In the early days it was a one- or two-man department. Now the technical staff numbers over 100. Parker research is responsible for the products and processes listed under "Parker Firsts" on the preceding page, and for hundreds of refinements and short-cuts that have meant money, time and material savings for plants throughout metalworking.

Parker's customers profit by having this imaginative, productive, and experienced research program working for them.

LOOK HOW CLOSE PARKER MEN AND PARKER PRODUCTS ARE TO YOU



Fast supply and service are important in the Parker package! The map shows coast-to-coast locations of plants, branch offices and technical representatives. No matter where you are, there's Parker service quickly available.

Parker technical representatives, backed by the most extensive know-how and experience in the industry, are themselves thoroughly experienced. The average Parker field representative has 11 years on the job!

WORLD-WIDE EXPERIENCE! Parker and its affiliates in Germany, England and France share over 125 years of experience in this specialized field.

For full information on any of the products listed below, call or write

PARKER RUST PROOF COMPANY, 2167 East Milwaukee, Detroit 11, Michigan

***Bonderite**
corrosion resistant paint base

Bonderite and *Bonderlube
aids in cold forming of metals

***Parker Pre-Namel**
pretreatment for porcelain enameling

***Parco Compound**
rust resistant

***Parco Lubrite**
wear resistant for friction surfaces

Tropical Paints
maintenance paints for industry since 1883

**Reg. U.S. Pat. Off.*

What's New at the

• National Metal Show •

(*Continued from page* 80)

Metallurgical Microscope

AMONG several products to be shown is a metallurgical microscope, called the Dynoptic. It incorporates a ball bearing focusing mechanism and revolving nosepiece. Low position fine focusing and below-stage mechanical stage controls afford ease of use. Either the improved vertical illuminator or the Tri-Vert illuminator can be utilized.

Another instrument to be demonstrated is the Macroscope, which is for examining small parts for burrs, cracks and surface characteristics. A choice of magnification is available,

Bausch & Lomb Dynoptic metallurgical microscope

viz. 10X, 20X or 40X. Working distance is 3½ in. The instrument can be furnished on a tripod or microscope-type stand, or for building into machinery or inspection devices.

Also demonstrated will be a focusable aerial image viewer, a camera accessory permitting sharp focusing in photographing specimens of low contrast and fine detail. *Bausch & Lomb Optical Co. Booth 440.*

Circle 83 on postcard for more data

Motors and Drives

THERE will be an exhibit of standard polyphase a-c motors, dripproof, totally enclosed—fan cooled, and explosion-proof. The new NEMA re-rated motors will be on display.

The newest product will be a Selectrol electronic variable speed drive, a new versatile means of obtaining infinitely variable speeds controlled by finger tip manual control, or by automatic control from a machine function such as tension, position, linear or angular precision speed, etc.

Also on exhibit will be the Gear-ED-Motors and Any-Motor gear reducers. The aluminum rotor used on the NEMA re-rated motors will be of interest. *General Dynamics Corp. Booth 951.*

Circle 84 on postcard for more data

New Stainless Steel

DISPLAYED for the first time will be material made of a new steel designated AM 350. This is a chromium-nickel-molybdenum stainless steel which can be fabricated while in the soft and ductile state, and then hardened by sub-zero cooling (minus 100 deg F). It was designed especially for use in the aircraft industry, but is expected by the maker to find wide application in other industries. Other applications might include flat and

(*Turn to page* 162, *please*)

geared

to work closely with your engineers on motor-driven products

We work so closely with customers that some consider our facilities a part of their own operations.

Close cooperation of our staff with your purchasing and engineering departments assures the right motor for your product.

This can mean improved product appearance, reduced weight, greater compactness and lower costs.

Aircraft de-icing pump motor.

Gear motor for slow-speed drive.

THE LAMB ELECTRIC COMPANY
KENT, OHIO

In Canada: Lamb Electric—Division of Sangamo Company Ltd.—Leaside, Ontario

Lamb Electric
SPECIAL APPLICATION FRACTIONAL HORSEPOWER **MOTORS**

INTERNATIONAL HARVESTER
GarWood
CLARK EQUIPMENT
CATERPILLAR
A-C
A. R. A.
JOHN DEERE
QUALITY FARM EQUIPMENT
Farmhand
MATERIALS-HANDLING IMPLEMENTS
The Frank G. Hough Co.
BLACKHAWK
CASE
HOPTO
DROTT
EQUIPMENT
Automotive Air Conditioning by NOVI
Novi Equipment Co. Novi, Mich.
DAYTON

6 Solid Reasons for using Anchor Products

We are extremely proud of the privilege to include these leaders of industry among the steady users of Anchor Hydraulic Hose Assemblies, Couplings and Fittings. We've worked hard to earn this privilege so, naturally, we're proud, too, of these six solid reasons why our customers use Anchor Products —

1. Patented Anchor Hose Couplings offer exclusive advantages to insure long, trouble free service.
2. Our program of testing is one developed over many years to best meet the demanding conditions under which hose assemblies must serve.
3. You will find a specific type of Anchor Hose Assembly, Coupling or Fitting to fully satisfy your hydraulic need.
4. Easy-to-install Anchor Hose Assemblies cut production costs.
5. Removals and replacements are simple, too — even in close quarters. This cuts maintenance time.
6. Anchor Hose Assemblies are available in all sizes from 3/16" to 3" I.D. for maximum recommended working PSI up to 7,000.

Profit by using Anchor Hose Assemblies, Couplings, Fittings.

Write us today and ask for our recommendations

Andy Anchor

TM

ANCHOR

Send for your free copy of this valuable Anchor Catalog. It's handy to have at your fingertips.

ANCHOR COUPLING CO. INC.
389 North Fourth Street Libertyville, Illinois
Branch Offices: Dallas, Tex.; Plymouth, Mich.

What's New at the

• National Metal Show •

(*Continued from page* 161)

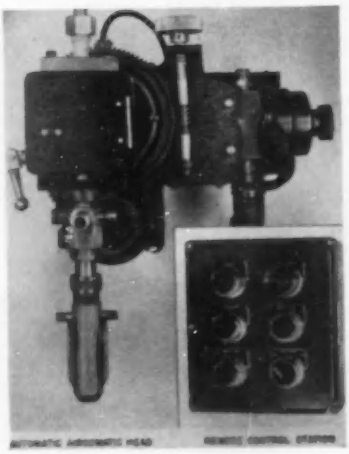
coiled springs, corrosion-resistant fasteners, saws and saw blades, piston rings, and pump parts.

Announced at the show will be a new process which is claimed to represent substantial progress in the alloy steel melting field. Also exhibited will be samples of and products made from plain and alloy steels, high temperature alloys, electrical steels, stainless and corrosion-resisting steels, forgings, castings, tubings, tool steels, punches, dies, and cemented carbide products. *Allegheny Ludlum Steel Corp. Booth 120.*

Circle 85 on postcard for more data

Automatic Welding Unit

EMPLOYING the inert gas consumable electrode method, is an automatic welding head to be displayed as a main attraction. Argon, carbon dioxide and helium shielding gases, and all kinds of welding wires (steel, aluminum, bronzes, stainless, and Strandalloy), from 0.030 in. in diameter and up, can be used. Single motor drive and simplified controls have been made possible, according to the maker. Known as the Aircomatic



The Aircomatic head and remote control station for automatic welding

welding head, the unit has a continuous current rating of 600 amperes.

Also to be introduced is the Airco 800 ampere TCV rectifier arcwelder,

(*Turn to page* 164, *please*)

"My name is Mary Lou.
I live at 916 Indian Road.
I am a good girl. I never, never play in the street.
Naughty girls play in the street so please drive carefully.
Even naughty girls are too young to have to go to heaven.
Watch out for naughty girls because sometimes even good little girls are naughty.
Please drive carefully."

The above message is brought to you in the interest of safer driving by Auto Specialties Mfg. Co. of Saint Joseph, Michigan, where we raise a lot of good little girls who sometimes run into the street and, incidentally, where we manufacture safer automobile brakes . . . Auto Specialties Double-Disc Brakes. They are ready for cars now.

You can stop smoothly and in a straight line at high or low speeds with Auto Specialties Double-Disc Brakes.

In a "panic stop" your brakes won't cause you to swerve. You'll have a better chance to maintain control of your car when it's equipped with Double-Disc Brakes.

Their adoption will be in keeping with increased horsepower, speed and with the industry's continuing desire to give the American motorist better, safer and more pleasant means of transportation.

For more information on these brakes, a 16-page, 4 color, illustrated booklet is available free. Write for "The Stopping Story." *And if you're driving today, watch out for Mary Lou.*

AUTO SPECIALTIES MFG. CO., INC. Saint Joseph, Michigan

Plants also at Benton Harbor and Hartford, Michigan and Windsor, Ontario, Canada
Manufacturing for the automotive and farm machinery industries since 1908

What's New at the

• National Metal Show •

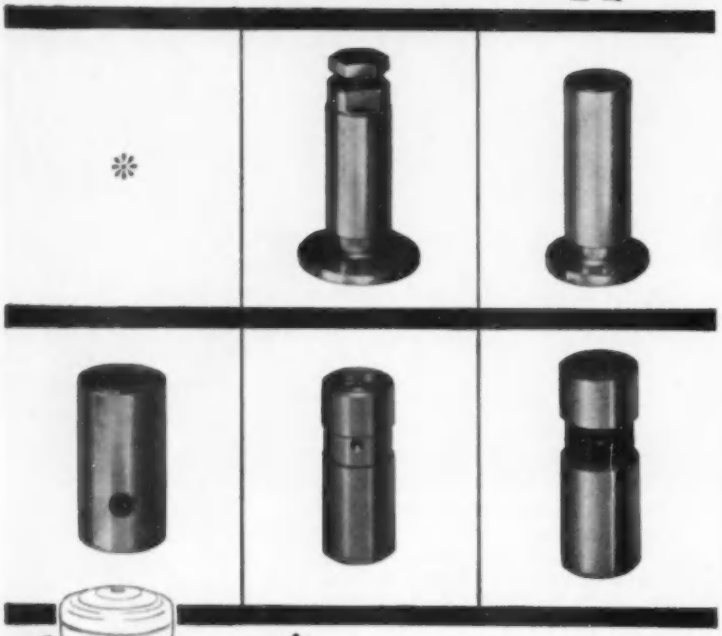
(*Continued from page* 162)

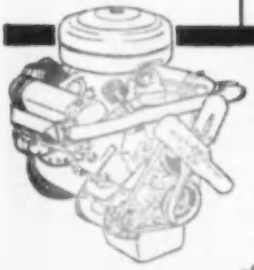
likewise designed for inert gas shielded consumable electrode welding, and featuring constant arc voltage for all automatic machine welding applications employing constant speed wire feed. This unit contains a three phase transformer and a rectifier bank. The arc voltage may be preset over a range of from 15 to 44 v; also pre-set to provide a higher initial voltage in establishing the arc. Once the arc is established, the voltage is automatically maintained at the constant setting, regardless of load conditions or changes in input line voltage.

Featuring a permanent magnetic roller, a flame-cutting machine called the No. 42 Camograph, will be introduced. It is said to be suitable for repetitive, accurate shape cutting with a single torch. The permanently magnetized tracing roller follows a metal template, including complex shapes; and the tool is designed for shape-cutting any practicable thickness. *Air Reduction Co., Inc. Booth 1750.*

Circle 86 on postcard for more data

JOHNSON *tappets*





keep pace with today's engines

Continual experimentation and excellent manufacturing methods show a steady product improvement that make JOHNSON TAPPETS worthy of your consideration. Only proven materials, covering a range of steel, chilled iron, and various iron alloys are used in the manufacture of JOHNSON TAPPETS, providing greater strength, light weight and increased wear resistance. Serving the AUTOMOTIVE — AIRCRAFT — FARM — INDUSTRIAL — MARINE Industries.

"tappets are our business"

JOHNSON JP PRODUCTS inc.

MUSKEGON, MICHIGAN

Lathe and Band Saw

A LONG-BED model of the Delta 11-in. metalworking lathe and an improved version of the Delta 14-in. band saw will be unveiled for the first time.

The long-bed model lathe offers a 5-ft bed (center to center distance 36 in.), which is about 12 in. longer than the standard model. It incorporates features of the earlier model, including a unique drive selector which makes possible a choice between loose and locked spindle, direct or gear drive; and a variable speed drive plus high-torque transmitting power.

The improved 14-in. band saw features a new eight-speed drive and accessible clutch on the end of the lower wheel shaft, permitting change-over without removal of vee belts except in change from lower four to higher four speeds. The eight speeds —40, 60, 83, 115, 157, 221 and 335 fpm for metal-cutting and 3000 fpm for wood-cutting—compare with four speeds offered by the earlier model. *Rockwell Manufacturing Co. Booth 1530.*

Circle 87 on postcard for more data

New Tools

EIGHTY-FIVE tools will be exhibited, among which will be the No. 167 series radius gages which make available five gaging surfaces on each gage for both convex and concave radii. Individual gages permit every gage to be used separately for accuracy and convenience. Four different sets are available covering the range of 1/64 to ½ in. by 32nds or 64ths. They are made of stainless steel.

The No. 253 dial indicator set provides in one kit a complete range of indicators to handle a variety of gaging jobs, at relatively low cost. The set contains three selected indicators—a No. 25-111 indicator graduated 0.0001 in., reading 0-5-0, range 0.025 in.; a No. 25-131 indicator graduated 0.0005 in., reading 0-25-0, range 0.125 in.; and a No. 25-441 indicator graduated 0.001 in., reading 0-100, range 1.000 in.

Also displayed will be a micrometer for measuring odd-fluted taps, milling

(*Turn to page* 166, *please*)

Get Complete Fluid Line Information from AEROQUIP CATALOGS

Now you can get the most complete hose line information available in these four informative, compact Aeroquip Catalogs . . . covering aircraft, industrial, marine and farm products. Each catalog offers invaluable aid in specifying, ordering and installing the proper Aeroquip hose lines, fittings, elbows, adapters and self-sealing couplings. Your request brings the catalog you need, at no cost. Write for it!

Free Hoselector! **This compact new Aeroquip "Hoselector" gives quick data on the most popular Aeroquip hose and fittings. Given are fluid applications, temperature and pressure ranges, bend radii and fitting types. Helpful to all design engineers . . . it's yours for the asking, just write.**

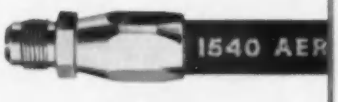
AEROQUIP SINGLE WIRE BRAID 1503 HOSE for medium pressure hydraulic, water, hot oil, crude and fuel oil, anti-freeze, gasoline, diesel fuel and air lines. In sizes from ¼" to 3"; pressures up to 1500 p.s.i.; temperature range —40°F. to +300°F.

AEROQUIP 1525 HOSE and *SOCKETLESS* fittings for low pressure oil, fuel and air lines on all applications. In sizes from ¼" to ⅝"; for pressures up to 250 p.s.i.; temperature range —40°F to 212°F. *SOCKETLESS* fittings in male pipe, SAE, J.I.C. threads. (Patent applied for.)

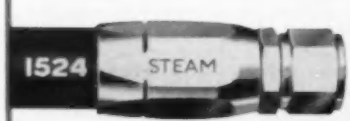
AEROQUIP DOUBLE WIRE BRAID 1509 HOSE for high pressure hydraulic, grease, crude and fuel oil, gasoline and air lines. In sizes from ¼" to 2"; pressures up to 4500 p.s.i., depending on size; temperature range —40°F. to +200°F.

AEROQUIP WIRE BRAID 1533 BUTANE-PROPANE HOSE for LPG engine plumbing or fixed installations where vibration is a problem. Listed by Underwriters' Laboratories. In sizes from ¼" to 2"; for pressures up to 1500 p.s.i., depending on size.

AEROQUIP'S NEW 1546 HIGH PRESSURE HOSE for fire-resistant hydraulic fluids of the Pydraul F-9 and Cellulube type. Ideal for industrial "hot spots". In sizes from ¼" to 2"; pressures up to 4500 p.s.i., depending on size.



AEROQUIP FREON HOSE for use on automotive and commercial air conditioning units and refrigeration equipment using Freon 12. In sizes from ¼" to 2", for pressures up to 300 p.s.i.; temperature range —20°F. to +170° F



AEROQUIP 1524 BURST-PROOF STEAM HOSE with ***"little gem"*** fittings for steam cleaning units, dry cleaning and pressing equipment, foundry equipment, plastic molding presses, rubber curing and vulcanizing equipment. Sizes ½" to 1", for pressures up to 200 p.s.i. (388°F.). With or without oil resistant cover.

AEROQUIP SELF-SEALING COUPLINGS allow quick separation and reconnection of fluid lines without loss of fluid or inclusion of air into the system. Replaces two shut-off valves. In sizes from ¼" to 1½", for pressures up to 2000 p.s.i.; temperature range —40°F. to +250°F.

"little gem" **is an Aeroquip trade mark**

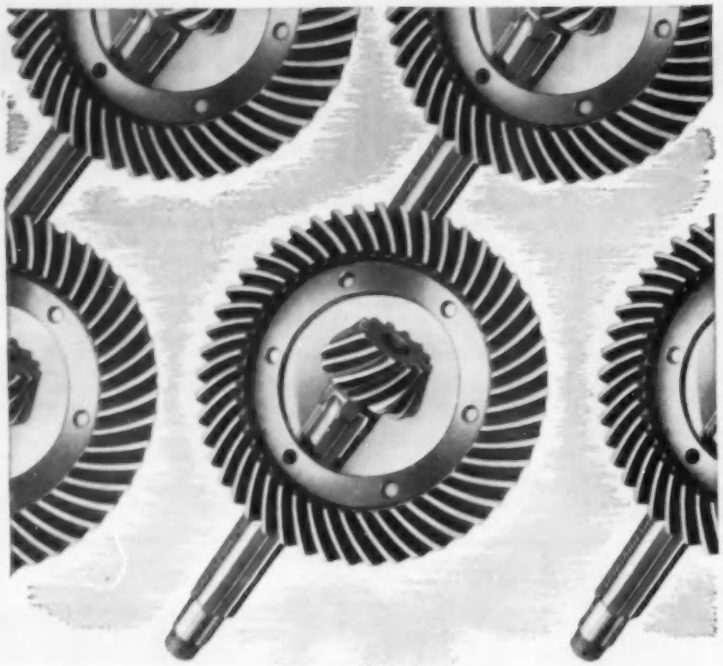
Engineering assistance available to manufacturers.

Aeroquip

REG. TRADEMARK

AEROQUIP CORPORATION, JACKSON, MICHIGAN

LOCAL REPRESENTATIVES IN PRINCIPAL CITIES IN U.S.A. AND ABROAD • AEROQUIP PRODUCTS ARE FULLY PROTECTED BY PATENTS IN U.S.A. AND ABROAD



Over and over again...

FAIRFIELD

SAVES YOU MORE ON TOP-QUALITY GEARS

Fine Gears Made to Order
for all manner of industrial equipment

SPIRAL BEVEL
STRAIGHT BEVEL
HYPOID
HERRINGBONE
HELICAL
DIFFERENTIALS
SPUR
WORMS AND WORM GEARS

• *Send for your copy of illustrated bulletin describing Fairfield's facilities for making gears.*

Fairfield is famous for repeat orders — and simply because quality is consistently high, and price is—well, just try to beat it!

How can Fairfield manage this unique position year after year? Truth is, it involves some tried-and-true mass-production methods plus some very special Fairfield ideas developed in the past 35 years of precision gear making.

Then, of course, Fairfield is ideally located with all facilities *under one roof.* Here you will find a complete metallurgical department, batteries of the most modern machines, testing laboratories, latest heat-treating equipment—all operated by skilled craftsmen working under expert engineering supervision.

There's another Fairfield service worth looking into—the expert recommendations on your particular gear problems. Your inquiry will receive prompt attention.

FAIRFIELD MANUFACTURING CO. *for FINE GEARS*

2303 SOUTH CONCORD ROAD • LAFAYETTE, INDIANA

What's New at the

• National Metal Show •

(*Continued from page* 164)

cutters, reamers, etc. Used like a conventional outside micrometer, it permits readings to be taken directly in thousandths of an inch. It is available in two models, No. 483 with V-anvil designed to accommodate cutters with three flutes, and No. 485 for cutters with five flutes.

The No. 657 magnetic base indicator holder has a permanent magnet type base with on-off push button. It holds firmly to any iron or steel surface, and mounts any No. 196 or No. 25 series indicator, permitting universal adjustment in any plane.

The exhibit will also include high-speed heavy-duty hole saws for cutting round holes in metal, wood and plastics. The range of sizes provides for cutting holes from ⅝ in. through 4½ in. *The L. S. Starrett Co. Booth 1720.*

Circle 88 on postcard for more data

Vacuum Brazing

VACUUM brazing furnaces will be featured in this company's booth, and will be described by means of a scale model, photographs and literature. The vacuum process is said to result in brazed joints having added resistance to fatigue and rupture. The units constructed thus far have retorts of ⅝-in. Inconel, 52 in. in diameter, by approximately six ft overall height. They can be made to braze from a few pounds to several tons of material per cycle. Cycle times will vary depending upon size of load, work-holding fixtures, and type of operation being carried out. *High Vacuum Equipment Corp. Booth 817.*

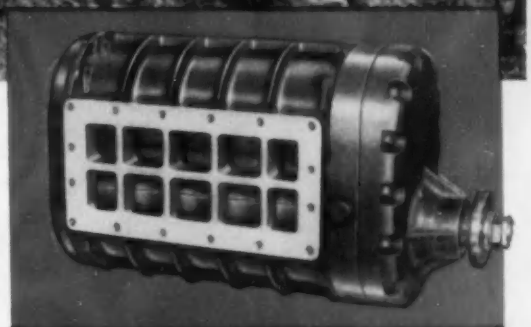
Circle 89 on postcard for more data

Electric Motors

NEW rerated motors, available in all ratings covered by the NEMA change in standards, will be the subject of one exhibit. One of these will be the type H Uniclosed unit, with its fully protected design, which has been made more compact than previous models. In the various sizes, the type H is said to meet the same standards as to temperature rise, torque, etc., but to provide more power in less space. Overload capacity has not been reduced, according to the maker.

(*Turn to page* 168, *please*)

GIANT HD-21 CRAWLER DOZES with Supercharged Power!



ALLIS-CHALMERS STANDARDIZES ON MIEHLE-DEXTER SUPERCHARGERS FOR THEIR DIESEL ENGINES

Like so many leading Diesel engine manufacturers, Allis-Chalmers specifies Miehle-Dexter Superchargers for their engines.

And that's one of the reasons this new giant torque converter driven crawler tractor—the Allis-Chalmers Model HD-21—claims to be one of the most powerful crawlers . . . anywhere! Rough and rugged dozing needs power aplenty. And here's *extra* speed at any load, *extra* pushing or pulling power at any speed, wider speed range and more range overlap—thanks to Miehle-Dexter Supercharged Power.

You, too, can boost the horsepower of your engines by 50% or more . . . and decrease weight per horsepower, too. Miehle-Dexter engineers can specify the exact size and type M-D supercharger for your engines. Standard M-D models available for applications to 750 hp. Write for bulletin.

FOUR FEATURES PROVE MIEHLE-DEXTER SUPERCHARGERS BETTER ON THE JOB

- Patented end plate seals eliminate metal-to-metal contact, assure longer life, help achieve fuel savings.
- Rotor wear strips eliminate contact between rotors and housing, assure longer wear.
- Lightweight aluminum rotors and aluminum case boost engine horsepower, do not add weight, safely allow high speeds.
- All parts are standardized, allowing easy field service and interchangeability.

NOW ON TEST...
AN ENTIRELY NEW TYPE
OF TURBOCHARGER!

MIEHLE-DEXTER SUPERCHARGER
Division of the Dexter Folder Company
100 Fourth Street • Racine, Wisconsin

What's New at the

• National Metal Show •

(*Continued from page* 166)

An unique Ventrifoil at both intakes, in combination with redesigned end brackets, is said to prevent splashings from entering and coming in contact with the windings, yet allow liberal air flow for ventilation.

Another development is a motor with a face type registered bracket and special shaft, for close-coupled centrifugal pump application. This likewise supplies more power in less space, and is of the Uniclosed design.

To provide for extra heavy-duty services where variable speeds are needed, the Varidrive motor has been increased to 60 hp. The larger capacity motors are equipped with dual varibelts of double-ribbed design which divide the transmission load. *U. S. Electrical Motors, Inc., Booth 1816.*

Circle 90 on postcard for more data

TUNG-SOL
ALL-GLASS SEALED BEAM
VISION-AID
HEADLAMP
Makes Night Driving Safer!
IMPROVED LENS PATTERN distributes light more effectively
NEW FILAMENT POSITION assures a more efficient beam pattern
FOG CAP minimizes annoying stray light
NEW REFLECTOR gives better control of light
• Low beam up from 35 to 40 watts
• High beam up from 45 to 50 watts
• 23% more light on the low beam
• 26% more light on the high beam
• Up to 80 feet more distance with the passing beam
• Negligible glare-back in fog, rain and snow
• Less uncontrolled light to annoy oncoming drivers
TUNG-SOL ELECTRIC INC., NEWARK 4, N. J.
Sales Offices: Atlanta, Chicago, Columbus, Culver City (Los Angeles), Dallas, Denver, Detroit, Montreal (Canada), Newark, Philadelphia, Seattle
Nationally distributed for replacement purposes in this distinctive package.
TUNG-SOL VISION-AID HEADLAMP
Miniature Lamps
Sealed Beam Headlamps
Signal Flashers
Radio And TV Tubes
Aluminized Picture Tubes
Special Purpose Tubes
Semiconductors

Chemical Processes

A LINE of phosphating materials which provide a bond on metals for painting or other organic finishing will appear among four items in this booth. On display will be a miniature production line installation and parts will be phosphated with iron and zinc phosphates during the show. Also on display will be a representative group of parts which have been phosphated by the company's various processes.

An alkaline rust remover for chemical removal without the use of acids or electrolytic equipment will be demonstrated. It is a powdered material which is said to quickly remove heavy rust, multiple coatings of paint, carbon and even red oxide primer without danger of hydrogen embrittlement and without affecting dimensional tolerances.

New phases of the Chem-Mill method of precision forming by chemicals, without the use of physical force, including a display of parts which have been contoured by this process, will be shown.

Flaw location with dye penetrants will be visually demonstrated by a 23-minute motion picture showing aspects of dye penetrant inspections from laboratory theory to production-line technics actually filmed on location during dye penetrant inspections.—*Turco Products, Inc. Booth 1319.*

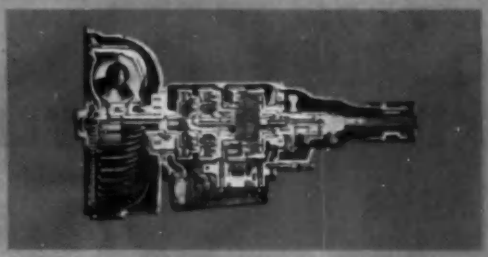
Circle 91 on postcard for more data

Gamma Gage Equipment

THE general purpose gamma gage testing unit TU-1A, designed as a precision instrument for non-destructive, quantitative measurement and control of the thickness/density of various materials, will be exhibited. Among its applications are precision measurement, and inspection and quality control, of the thickness/density of various materials; detection and control of voids and seams in various materials; precision measurement of fluid levels; and detection and control of fluid levels. The materials which can be tested and controlled include metal castings and machined parts, glass and rubber products, oils, and chemicals. In addition, the instrument can be used on a laboratory scale for precision measurement and inspection, or can be used as a production control device operating automatically.

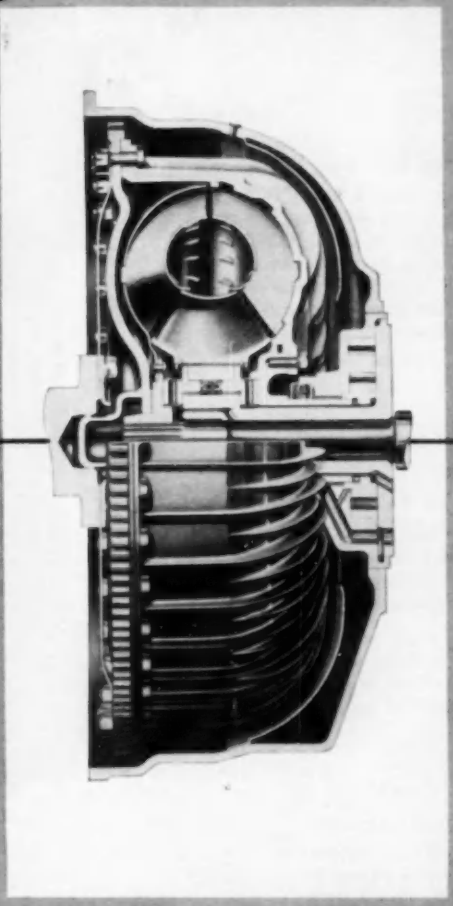
On exhibit will also be the Sardap gamma gage TU-3A, an automatic industrial process controller of the

(*Turn to page* 172, *please*)



BORG & BECK TORQUE CONVERTER

Stepped-up capacity for "power-loaded" engines



Through skillfully engineered design, Borg & Beck has substantially stepped up the capacity of its torque converter to carry the increased torque of today's power-loaded engines. Compact yet light in weight the Borg & Beck converter transmits today's greatly stepped-up horsepower smoothly, quietly, efficiently.

Air-cooled, its 68 fins dissipate heat quickly, dependably. Torque ratio is 2.1:1. Can be readily disassembled in the field for inspection or service.

Precision built throughout—every unit exactingly tested for balance, uniformity and oiltight seal—for maximum performance, minimum maintenance.

Consult our engineers—without obligation

BORG & BECK CLUTCH · THE STANDARD ·

BORG & BECK DIVISION

BORG - WARNER CORPORATION

Chicago 38, Illinois

ENGINEERING BW PRODUCTION

at no extra cost to you . . .

NEW Quality Features on All AIR and HYDRAULIC CYLINDERS

CASE HARDENED CHROME PLATED PISTON RODS

On all Miller Air and Hydraulic Cylinders

Benefits To You

CASE-HARDENED Piston Rods (52-54 Rockwell "C") provide practically complete protection against damage from hammer blows, wrench-dropping, mishandling, and similar occurrences.

The HARD CHROME PLATING over the case-hardened rods protects against scratch-damage and rust.

"TEFLON" WIPERS

On all Miller Air and Hydraulic Cylinders

Benefits To You

"TEFLON" Rod Wipers and "TEFLON" Hydraulic Seals withstand temperatures from —100° F. up to 500° F. They are impervious to practically all known chemicals, including the fire-resistant, special, and standard hydraulic fluids in current use.

"TEFLON" HYDRAULIC ROD SEALS

On all Miller Hydraulic Cylinders only

RUST RESISTANT SURFACES

On all Miller Air and Hydraulic Cylinders

Benefits To You

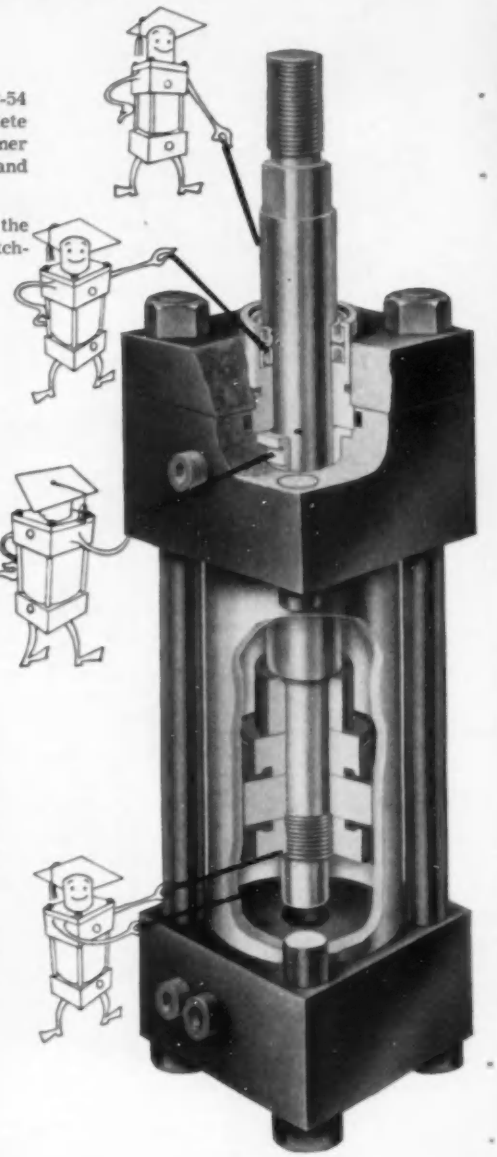
Highest quality Black Ferric Oxide Finish provides rust protection in air cylinder operation and on all cylinders during shipping and installation.

Cylinder heads, caps, mountings, pistons, followers, and the unplated portions of the piston rods have this finish. It is not recommended for water service.

WRITE FOR CYLINDER BULLETINS H-104 and A-105

Complete Miller cylinder line includes: air cylinders, 1½" to 20" bores, 200 PSI operation; low pressure hydraulic cylinders, 1½" to 6" bores for 500 PSI operation, 8" to 14" bores for 250 PSI; high pressure hydraulic cylinders, 1½" to 12" bores, 2000-3000 PSI operation. All mounting styles available.

Over 8,000 Different Cylinder Selections Available for Immediate Delivery. Write for Complete List.



EFFECTIVE DATES

These new Miller features will be provided at no extra cost after January 1, 1956—and at Miller's option prior to that date.

SALES AND SERVICE FROM COAST TO COAST

CLEVELAND • YOUNGSTOWN • DAYTON • TOLEDO • CINCINNATI • COLUMBUS
PITTSBURGH • PHILADELPHIA • BOSTON • HARTFORD • NEW YORK CITY
BUFFALO • ROCHESTER • MINNEAPOLIS • GRAND RAPIDS • DETROIT • FLINT
FORT WAYNE • SOUTH BEND • INDIANAPOLIS • MILWAUKEE • LOUISVILLE
KANSAS CITY • SEATTLE • LOS ANGELES • SAN FRANCISCO • BALTIMORE
DENVER • ST. LOUIS • MOLINE • CHICAGO • HOUSTON • ATLANTA
TORONTO, CANADA and OTHER AREAS

MILLER FLUID POWER CO.

2028 N. Hawthorne Ave., Melrose Park, Ill.

AIR & HYDRAULIC CYLINDERS • BOOSTERS • ACCUMULATORS
COUNTERBALANCE CYLINDERS

Four More Miller Firsts . . .

Our "Report To Cylinder Users" was a simple statement of Miller Fluid Power Company's policy. In it was mentioned our dedication to the constant improvement of our products.

In line with this policy, here are new quality cylinder features that will eliminate many of the problems which you have reported to us.

Miller gave cylinder users one of its firsts when we chrome-plated all cylinder piston rods. Our reason was obvious. Chrome-plating gave every rod a mirror-like finish that no corrosive or abrasive dust could scratch. Miller made this chrome-plated, longer lasting rod standard. AT NO EXTRA COST.

Preventing Damage To Piston Rods

There were still plenty of hazards to which piston rods were subjected. A careless workman with a too handy wrench or pair of pliers meant a scored piston rod. A falling object striking the rod dented the softer metal beneath the plating of chrome. A jolt during assembly left its trouble-breeding mark. All of these nicked and scored the piston rods, damaging the whole assembly. Little could be done about this beyond repair and replacement—until the Miller announcement that from now on the piston rods on all cylinders — air and hydraulic — will be specially hardened (52-54 Rockwell C) to foil the carelessly used tool, the accident in transit or assembly, the falling object or unnoticed knock. Naturally, the new hardened rods will still be chrome-plated. Miller will now make this super quality an everyday standard. AT NO EXTRA COST.

Meeting The Challenge Of The New Demands On Seals

Rod seals on Miller hydraulic cylinders were constructed to be leakproof under all ordinary operating conditions. We guaranteed this. But we also stated in all our catalogues that for special conditions there must be special rod seals at an extra cost. Rod seals to withstand high temperatures had to be specially constructed. Where fire resistant fluids were used, special rod seals had to be provided at an extra cost. Because many fire resistant fluids destroy ordinary packing.

The present widespread use of these fluids and excessive heat generation from high speed operation and increased loads have resulted in reports of trouble on cylinders where ordinary seals were subjected to these hazards. These reports were not received with joy at Miller, even when the fault was definitely not ours. We don't like to have trouble develop on any Miller installation under any condition. So we decided to do something about these problems of the rod seals.

A new expensive material known as "TEFLON" has been developed for use as seals. This material is impervious to temperatures from —100° to plus 500° F. It resists all known fluids, even the most destructive of the fire resistant fluids. Now, every piston rod on every Miller hydraulic cylinder will be fitted with "TEFLON" Piston Rod Seals. AT NO EXTRA COST.

In addition, all rod wiper seals on all Miller Air and Hydraulic cylinders will be of the same chemical-and-heat resisting Teflon material.

These Teflon rod wiper seals will be standard on every Miller cylinder, regardless, of how and where it will be used. This is Miller's way of doubly insuring cylinder users against all possible hazards. AT NO EXTRA COST.

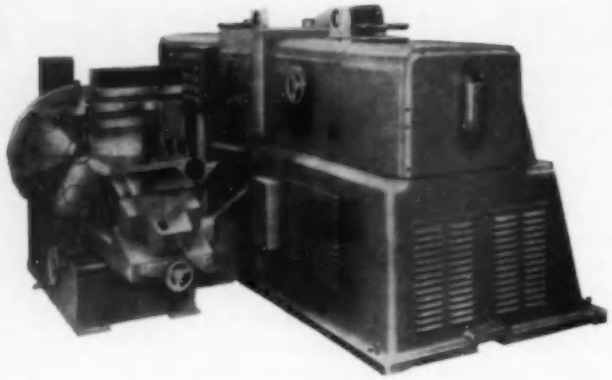
Protection Against Rust

The barrels of Miller air cylinders are of moisture-resistant brass. The barrels of hydraulic cylinders, since they run in oil, are protected once they are installed and in operation. Beyond this all cylinder parts are subject to rust and corrosion. Such exposed parts as heads, caps and tie rods quickly show the unsightly evidences of rust. At least this has been so up till now. But all this is now being corrected.

From now on Miller will protect all these parts on both air and hydraulic cylinders with a black oxide process in which a chemically created ferric oxide coating is developed on the surface of the metal to protect against rust and other corrosion. Every Miller cylinder sold will carry this added protection. AT NO EXTRA COST.

These four new Miller firsts are added to the many firsts established by Miller. Like other Miller firsts which created new departures in cylinder design and construction, these are now offered as Miller standard specifications. AT NO EXTRA COST.

MILLER FLUID POWER COMPANY
2028 N. Hawthorne Avenue
Melrose Park Illinois



400 AUTOMOTIVE PISTON RINGS per minute are ground within .0002" tolerances on this new Besly Model 240 Double Horizontal Spindle Grinder. Electro-magnetic rotary pick-off disc at left automatically delivers piston rings in continuous flow between abrasive discs.

BESLY Announces New High Precision, High Production Grinder

Grinds parallel surfaces within .0002" at rates as high as 400 units per minute

The new model No. 240 Besly Double Horizontal Spindle Grinder was developed to meet today's increasing demands for greater accuracy and higher production. Grinding the parallel faces of piston rings is a natural job for the No. 240 Grinder. Automotive rings are being ground at the rate of 400 pieces per minute to .0002" for parallelism.

New in Design

The Model 240 is an entirely new development in the Besly line of precision grinders. New features include automatic controls which are accessible from either side of the grinder. Even dressing each disc with its own separate dresser is push-button controlled. All controls, motors, starters and hydraulic units are enclosed within the rugged machine base.

Sealed Spindle Quill Construction

The grinder is equipped with Besly exclusive Sealed Spindle Quill construction which replaces old-fashioned ways with their problems of wear and inaccuracy. Quill construction also permits smooth, accurate adjustment of the abrasive discs and avoids transmitting motor vibration to the grinding spindle.

Fast Feed

High speed feeding is achieved through a simple electromagnetic pick-off disc which supplies work to the grinder in a continuous stream. Design of the machine has cut down-time for dressing, disc changing and set-up to one third of that required by other grinders.

NEW BULLETIN

Write for free copy of Bulletin 200 with description of complete Besly line of Double Horizontal Disc Grinders including the new 240.

BESLY-TITAN "Job-Fitted" ABRASIVES CAN CUT YOUR COSTS

Besly-Titan Discs and Wheels are custom-made for each job. This costs you no more, but gives more production and longer abrasive life. Write for new Abrasives Catalog.

BESLY-WELLES CORPORATION

Established in 1875 as Charles H. Besly & Co.

132 DEARBORN AVENUE, BELOIT, WISCONSIN

Besly Grinders and Accessories • Besly Taps, Drills, Reamers, End Mills • Besly-Titan Abrasive Wheels

What's New at the

• National Metal Show •

(*Continued from page* 168)

non-contact type, for use where adverse temperature, pressure, humidity and corrosive conditions prevail. Applications include liquid level control in tanks and metal smelting furnaces, process control of chemical processing systems, traffic control of fluid transportation systems, and fill control of fluid canning systems. The system can also be used where thick or opaque container walls render other no-contact systems inoperative. It can be installed for various production speeds and various level or process tolerances. *Nuclear Research Corp. Booth 1857.*

Circle 92 on postcard for more data

New Tubing Sizes

STAINLESS light-wall tubing in expanded size limits will be introduced, the production limits for types 304 and 321 Weldrawn (trademarked welded and cold drawn grade) having been expanded to 2 1/16-in. OD. The size limit for seamless light-wall tubing is now 2 1/16-in. OD for AISI types 304 and 321 and Monel metal, and 2½-in. OD for type 347.

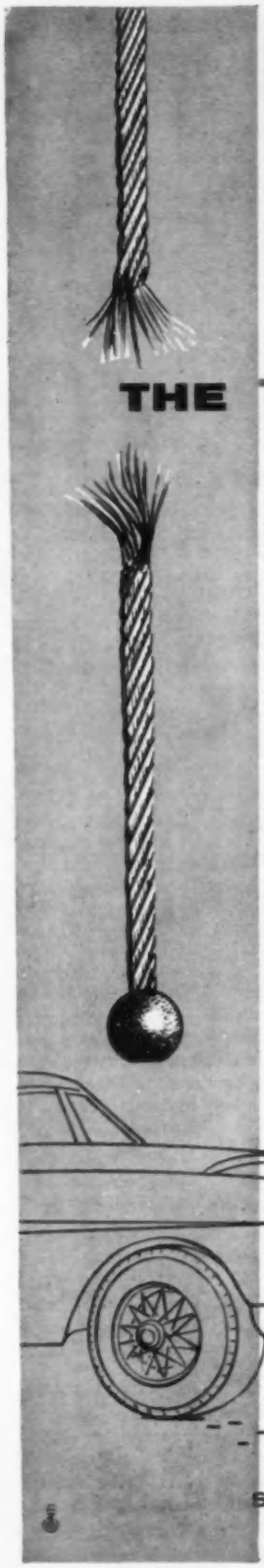
In the shaped tubing display will be ovals, ellipticals, squares, rectangles, hexagons, and several special shapes. More than a thousand sizes of tubing, from 0.008-in. OD to 2½-in. OD, in more than 55 analyses, will be exhibited. The analyses include carbon, stainless, nickel and nickel alloy steels, beryllium copper, titanium and zirconium. *Superior Tube Co. Booth 1470.*

Circle 93 on postcard for more data

Welding Alloys, Fluxes

DEMONSTRATED for the first time, among a number of products, will be a low hydrogen type steel electrode called EutecTrode 66 AC-DC. Another introduction is EutecBor No. 9, a high alloy hard overlay which is said to offer the utmost in wear and corrosion resistance at normal and elevated temperatures. Eutector Flux 190-E is a new flux for use with EutecRod 190 on aluminum. For high-strength machinable deposits on alloy cast iron Xyron 2-25 AC-DC is offered. The new EutecTrode 2101

(*Turn to page* 174, *please*)



Incredible!

THE TEST CABLE BROKE ...BUT THE FITTING HELD

Leading automotive manufacturers demand maximum performance from their many components—that is why, for many years, they have specified Bergen cables, assemblies and slings for the toughest services. They know from millions of operating miles that Bergen experience, precision manufacturing and quality materials assure lasting dependability under the most adverse conditions.

SPECIFY BERGEN FOR:

- **High test swaged cable assemblies—conventional or unique.**
- **Immediate shipment of standard cables.**
- **Quick deliveries of *special constructions* or *short runs*.**
- **Long lasting, dependable service.**

Bergen's rotary swaged fittings prove stronger than high test cable

BERGEN AUTOMOTIVE LITERATURE CAN HELP YOU SOLVE MANY DESIGN PROBLEMS.

Write for a copy today ...

SERVING THE LEADERS OF INDUSTRY

102 Gregg Street, Lodi, New Jersey

AUTOMOTIVE DIVISION

BERGEN

WIRE ROPE COMPANY

(*Continued from page* 172)

DC is an improved electrode for welding aluminum. A further exhibit will be AluTin No. 51, a flux cored, solder type alloy for joining aluminum and other metals. *Eutectic Welding Alloys Corp. Booth 1225.*

Circle 94 on postcard for more data

Metals and Alloys, Tool Grinder

A LINE of high speed steels, tool and die steels, stainless specialties; Firthite (sintered carbide) tips and blanks, tools, dies and wear parts; high temperature alloys; chromium carbides; heavy metal; cermets and zirconium will appear in one exhibit. The latter five materials, due to unusual properties, are said to be suited for nuclear power applications such as zirconium for structural material for reactors and fluid conduits and tubing; heavy metal for shielding; high temperature alloys for tubing, pump parts and turbine components; chromium carbides for valves, steam nozzles, pumps and bearings; and cermets for turbine parts in extremely high temperatures.

Also on display will be MeX-Grind, a new concept in grinding technology, for servicing and modifying carbide tools. The method operates basically from an electrode and cast iron wheel, the grinding being accomplished by an electro-spark process.

The new Thriftool, a throw-away toolholder, will also be shown. *Firth Sterling Inc. Booth 740.*

Circle 95 on postcard for more data

The S.S.White swaging method revolutionized the making of speedometer cable . . .

S.S.WHITE "FIRSTS" have meant better, more economical speedometer cable

FIRST to pioneer the use of flexible wire wound cable.

FIRST to introduce automation in speedometer cable manufacturing.

FIRST to develop machines for arc-cutting speedometer cable.

FIRST to introduce integral drive squares.

FIRST to develop satisfactory swaging equipment for speedometer cable.

FIRST to develop small diameter, thin wall speedometer casing.

FIRST to introduce galvanized casings for speedometer service.

Making speedometer cable is a complex, exacting business, which not only calls for specialized equipment, but the "know-how" to go with it.

Take the problem of forming the integral drive square, currently used on all speedometer cable. The old method, using a two piece die was costly and unreliable. Maintenance of dies was high, it was difficult to maintain correct tolerances and it took at least four (and sometimes six or seven) blows of the press to produce a good square.

As has often been the case in speedometer cable design and manufacture – S.S.White furnished the answer . . . the S.S.White Squaring Fixture No. 10 which formed an accurate square with a *single stroke* of the press – which assured close tolerances on high production runs – and which practically eliminated all maintenance of dies and equipment.

The S.S.White Squaring Fixture No. 10 is now the standard of the industry and is used by all speedometer manufacturers.

S.S.WHITE INDUSTRIAL DIVISION
10 East 40th Street, New York 16, N. Y.

S-6

FIRST NAME in flexible shafts for speedometer drives, industrial power drives and remote control.

S.S.White

Fatigue Testing

OPERATING exhibits will comprise a line of multi-range dynamic fatigue testing machines, high temperature creep testers, and allied equipment. A feature will be the multi-range design which is said to make possible a high dynamic amplitude on a standard high-speed dynamic testing unit. Visitors will be able to witness specimens being broken on the Ivy-12, a 12,000 lb capacity fatigue tester which is representative of the line.

Another attraction will be a fully automatic program controller which follows and repeats any predetermined load "intensity-duration" spectrum and which may be adjusted to meet individual specifications.

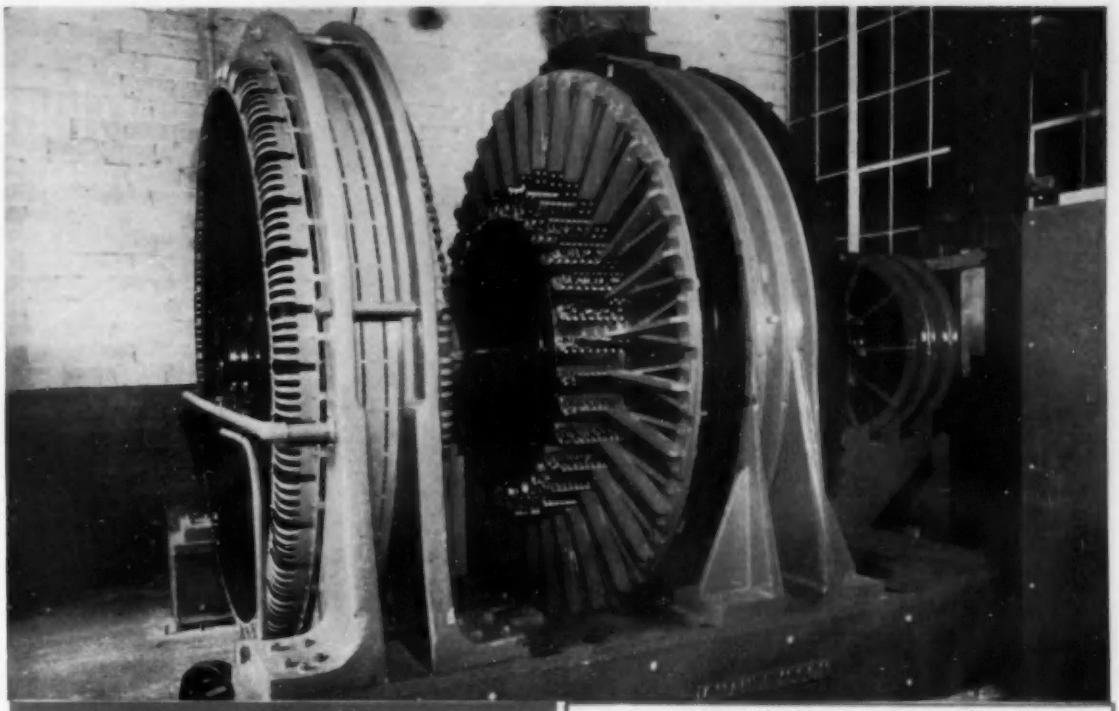
Other newly developed equipment will include the BJL-1 dynamic creep tester, an industrial version of a well-known university laboratory machine. The high temperature Extensometer for use with the BJL-1, which allows creep to be measured directly from the ends of the specimen, will also be displayed. *The Ivy Co. Booth 1949.*

Circle 96 on postcard for more data

Microscope, Metallograph

FEATURED will be a high-temperature microscope which has been developed to provide a practical means for both visual examination and the photographic recording of specimens during their molten state in a microfurnace. Intended for refractories and ceramic research, it has been found useful in experiments to determine the corrosion of different refractories by different types of glass; melting points of crystalline material; softening and vitrification behavior of amorphous material, eu-

(*Turn to page* 178, *please*)



INDUSTRY LEADERS CHOOSE

Chandeysson

ELECTROLYTIC GENERATORS

Example:

Low Cost, Low Voltage Power Conversion at Doehler-Jarvis Division of National Lead Company, Toledo, Ohio.

20,000 ampere Chandeysson Generator recently installed at Doehler-Jarvis Division is just one of several Chandeysson Generators in use by this well-known industrial manufacturer.

For any kind of power conversion application, Chandeysson Generators give you lifetime service, at low cost.

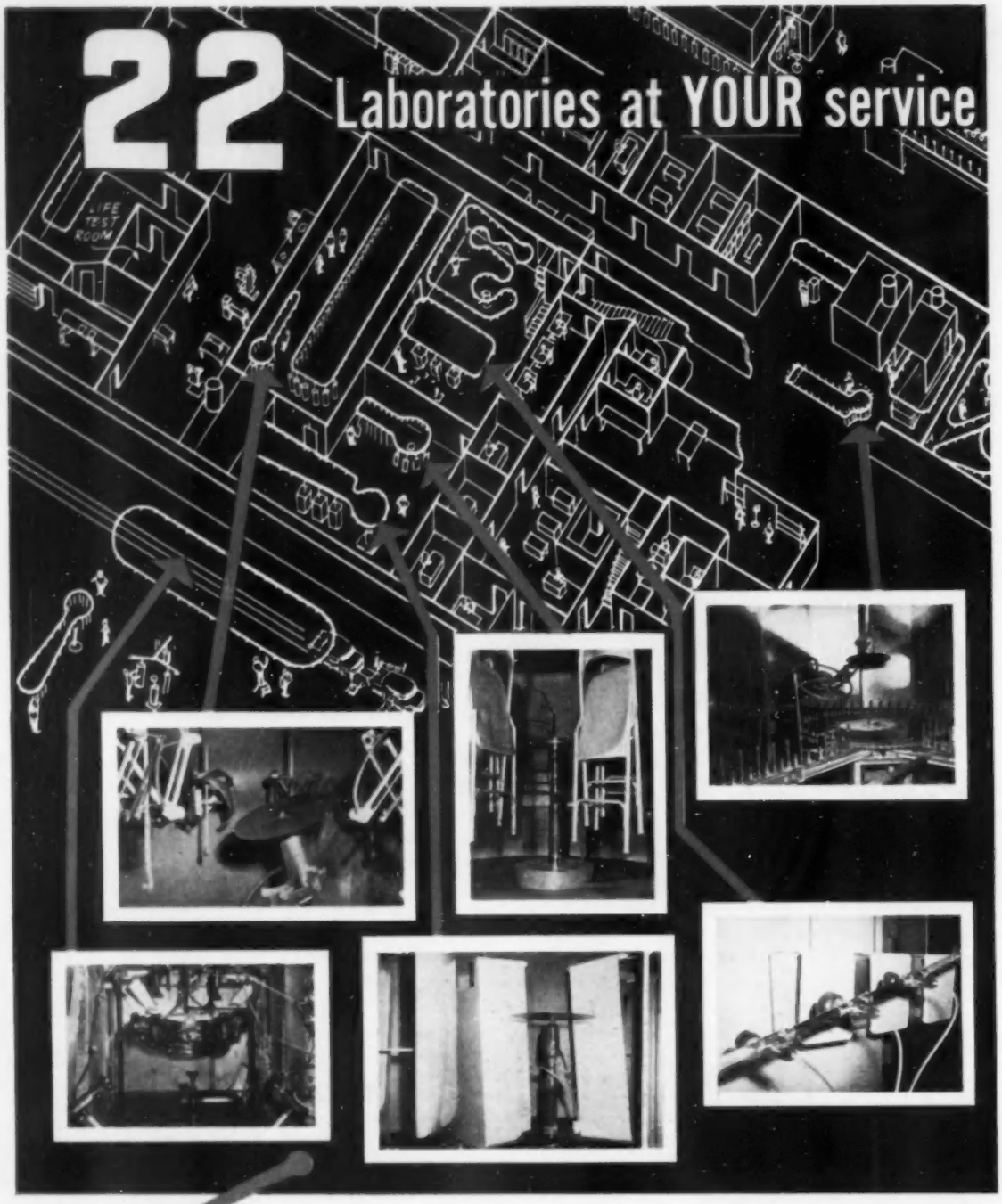
Use Chandeysson GENERATORS

For Low-Voltage Power Supply AND SAVE 4 WAYS

1. **Use Less Power**... precision-built for high efficiency and built-in voltage regulation.
2. **Be Sure Of Power When You Need It Most**... overload capacity as great as 50% momentarily and 25% sustained, without distress or damage.
3. **Get More Out Of The Power You Pay For**... built-in high power factor at no extra cost.
4. **Enjoy Lifetime Power Dividends**... sustained, lifetime overall constant efficiency as high as 85% does not decrease with age or overload.

For product information write for bulletins D-101 and D-102—for names of users and installation data ask for bulletin D-104.

CHANDEYSSON ELECTRIC COMPANY • 4070 Bingham Ave., St. Louis 16, Missouri 50A



YOUR JOB, LIKE THESE SHOWN ABOVE, WILL BE TEST PROVEN

under simulated production conditions to determine cost-saving benefits and other advantages. Ransburg also maintains other test facilities in Los Angeles, London, England; Bad Hersfeld, Germany; Paris, France and Sydney, Australia.

to prove the painting of YOUR products with

RANSBURG

Electrostatic Painting Processes

Let us make laboratory tests and prove the advantages and cost-saving benefits of painting YOUR products AUTOMATICALLY with one of the Ransburg Electro-Spray Processes.

GET THE FACTS . . . IT COSTS YOU NOTHING!

STEP BY STEP—HERE'S WHAT YOU GET...

- Survey of your plant by Ransburg's experienced field engineers, including savings estimate.
- Lab painting demonstration of your products, using equipment closely simulating your own production conditions.
- Accurate measurements of paint film thickness.
- Engineering report of detailed tests to determine paint and labor savings.
- Coated samples of your job, lab production photos, and even movies if desired.
- Detailed drawings of equipment and workholder.

All of the above without obligation to you. And, before equipment is installed you receive detailed, pre-installation instructions. Too, a well-qualified, experienced engineer supervises installation and trains your operator on the job. Ransburg offers continuing laboratory and field service to help you with any of your finishing operations.

Ransburg

ELECTRO-COATING CORP.
Indianapolis 7, Indiana

● **First,** Ransburg sales engineers will make a survey in your plant to check the possibilities of using Electrostatic Spray Painting on your products. Next, you will send samples of your unpainted products—with paint—to the Ransburg laboratories in Indianapolis.

Here, the technical staff takes over. The Ransburg Engineering staff—which includes PH.D's and Masters in Physics, Science, Electrical, Mechanical and Chemical Engineering—makes a complete study of your job. Not only do they have the necessary academic training, but they have the "know how" gained from years of actual experience in the field. Ransburg, you know, was the pioneer in Electrostatic Spray Painting 15 years ago. Engineers and well-qualified technicians have at their disposal every facility for conducting complete tests, simulating your own production conditions. They'll decide which type conveyor is best suited for your job. (There's a conveyorized lab set-up—22 in all—to handle products ranging in size from automobile bodies and chassis to small components, such as window hardware.) They'll design workholders, if necessary, and determine exactly how your job can be run to your best advantage. Details, such as fixture spacing, will be worked out too.

After preliminary studies and tests, you are invited to Indianapolis to see your job run in the lab. If you wish, photos and even movies of your test run can be made and furnished for your own production people to study. You see first-hand what Ransburg Electrostatic Spray Painting can do for you in your own plant.

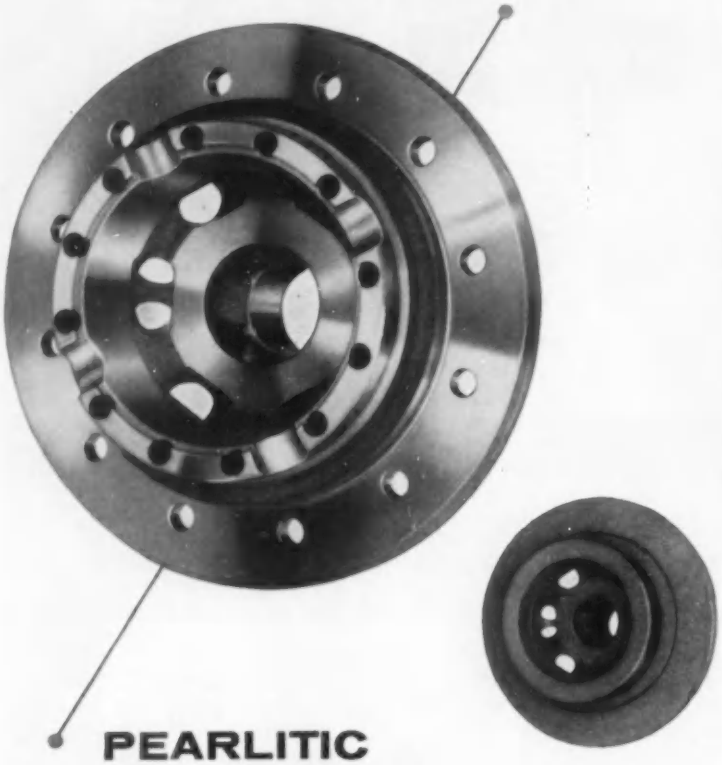
YOU GET PAINT AND LABOR SAVINGS

Paint usage is accurately measured during the demonstration. The Ransburg No. 2 Process will provide savings up to five times the paint mileage of hand spray. And, one unit can do the work of many hand sprayers. You will see the improved, uniform quality of the work . . . you'll know what kind of increased production to expect, and you can recognize labor savings. ALL OF THIS WITHOUT OBLIGATION.

Ransburg service doesn't end there. After the equipment is installed in your plant—with our supervisory help—we will train your operator and continue to work with your finishing department. Our technically-trained field service engineers are always available to assist with any of your finishing problems.

Briefly, that's our story. Now it's your move. Call or write. Dept. A.

MACHINABILITY INDEX 80-90*



PEARLITIC MALLEABLE CASTINGS

* B1112 STEEL = 100

Low machinability index of 80-90 (B1112 steel = 100) is probably reason enough to warrant serious consideration for your product.

But pearlitic malleable castings—from National—don't stop there. They have great ultimate strength . . . resist wear under heavy loads at high speeds . . . make excellent non-seizing bearings . . . can be air or liquid-quenched . . . can be smooth-finished.

Don't overlook the advantages of pearlitic malleable. For pearlitic malleable castings—from National—can often reduce manufacturing costs, weight and assembly time . . . can increase the sales potential of your product. AA-1506

NATIONAL MALLEABLE AND STEEL CASTINGS COMPANY

Cleveland 6, Ohio

The Nation's largest independent producer of malleable and pearlitic malleable

What's New at the

• National Metal Show •

(*Continued from page* 174)

tectics and ceramic compositions; and inversion point determination, nature of certain types of crystallization and divitrification.

Also featured will be a desk-type metallograph permitting microscopic study of metals under polarized light, as well as phase and bright field illumination. The new model 2400P will be of value to those laboratories dealing with anisotropic metals, identification of non-metallic inclusions where polarized light is required, examination of unetched specimens, or determination of differences of level of areas within a specimen. *American Optical Co. Booth 925.*

Circle 97 on postcard for more data

Chromallizing

THE first public demonstration of a process for increasing the heat, wear and corrosion resistance of metals by diffusing chromium into the surface at high temperatures will be presented. Electric strip heaters and tubular heaters, as well as electric paint burner shields, and laboratory ware including triangles, ring stands and burner chimneys, will be displayed to illustrate the value of Chromallized parts. Samples showing its application to sintered iron powder metallurgical parts will also be available for examination.

The exhibit will additionally contain the wear-resistant Chromacarb case on high-carbon steel and cast iron parts. This process leads to the formation of hard, wear-resistant surfaces containing chromium carbide.—*Chromalloy Corp. Booth 2154.*

Circle 98 on postcard for more data

Spectrometer

EXHIBITED will be the Spectromet, a small direct-reading spectrometer for quality control analysis directly on the production floor. The instrument features a sealed optical system, dust-tight electronics and an automatic servo-monitor for maintaining optical alignment. It was developed to handle routine analytical control and research problems of limited complexity, with speed and precision. The instrument design incorporates basic requirements for sim-

(*Turn to page* 180, *please*)

ANOTHER UNUSUAL PROBLEM SOLVED BY LORD

LORD MOUNTINGS TAKE THE SHOCK LOSS OUT OF SHIPPING!

Why accept costly shipping damage as a "necessary evil" when your equipment can be shipped safely with LORD re-usable Shock and Vibration Control Shipping Mountings?

Available in standard models or specifically designed for extraordinary problems, these bonded-rubber mountings have practically eliminated costly shipping damage to such fragile units as electronic tubes and instruments, business machines, and other easily-damaged equipment.

LORD mountings effectively reduce shock damage with the proved combination of specially designed, shock-absorbing rubber bonded to metal for structural strength and mounting accuracy.

Whether your "shipping-shock" problems can be solved with standard LORD mountings or will require a special design, LORD engineers will gladly show you how LORD mountings can insure delivery of your equipment without damage to its accuracy or sensitivity.

Remember—LORD Products are engineered to provide the best in shock and vibration control! Contact the LORD Field Engineer nearest you, or.

LORD MANUFACTURING COMPANY, ERIE, PA.

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PHILADELPHIA, PENNA. LOcust 4-0147	DAYTON, OHIO Michigan 8671	CHICAGO, ILL. Michigan 2-6010	CLEVELAND, OHIO SUperior 1-3242

"In Canada—Railway & Power Engineering Corporation Limited"

LORD BONDED RUBBER

DESIGNERS AND PRODUCERS OF BONDED RUBBER PRODUCTS SINCE 1924

What's New at the

• National Metal Show •

(*Continued from page* 178)

ple analytical problems up to six elements in a single matrix. Using an original four-in. diffraction grating, having a three-meter focal length and 15,000 lines per inch, a first order spectral range of approximately 2000A is available at the focal curve. Problems requiring second order spectra can be set up with 1000A available. *Baird Associates, Inc. Booth 852.*

Circle 99 on postcard for more data

Brinell Tester

THE feature in one booth will be a Color Glance Brinell hardness tester, which is being shown on the East Coast for the first time. Three series of lights automatically signal the relative hardness of the material being examined, i.e., yellow "too hard," green "within range," or red "too soft." The limits which control the lights are adjustable for a range to suit the requirements. It is stated the test cycle can be completed in two seconds, making possible up to 800 tests per hour if rate of feed is sufficient.

Included in the same exhibit will be several other types of testing machines, among which will be a ductility (cup) tester, Flex-Tester, proving rings, other models of Brinell testers, and miscellaneous instruments and accessories. *Steel City Testing Machines, Inc. Booth 324.*

Circle 100 on postcard for more data

Tin Supply Assured

THE theme in one of the exhibitor's booths will be the reliability of supply, not only in the years immediately ahead, but far into the future, of Straits tin from Malaya.

The Bureau, representing in the US the producers of tin in the Federation of Malaya, states there is no question about the dependability of supply and the adequacy of reserves. Further, that US industrial consumers can rely on imports equal to last year's total of $84 million or more in future years to meet increasing demands. Two-thirds of the tin consumed in American industrial processes is now coming from Malaya, according to the Bureau.

Colored slides, made in Malaya, will show the various ways in which tin is mined there and how the expanded prospecting program is uncovering new fields. Nearly a half million dollars has been allocated in this year's budget for geological surveys based upon modern technics. Underwater exploration is currently being conducted off the west coast of the Malay Peninsula.

The exhibit will also feature a number of displays of current uses of tin in industry. Included will be 100-lb ingots, various kinds of tin plate, new forms of solder, phosphor bronze and new tin alloys. *Malayan Tin Bureau. Booth 1772.*

ROTO FINISH
your new opportunity in
controlled precision finishing
Roto-Finish processes are controlled precision finishing operations using low cost mass production techniques, which maintain exact tolerances on most any size or shape precision part with no significant dimensional changes. Roto-Finish speeds production, cuts maintenance expense, minimizes operational costs, yet produces top quality finishing results. Roto-Finish offers latest in controlled methods, materials and special purpose fixture equipment. Roto-Finish is your new opportunity in controlled precision finishing with guaranteed results!
Write for catalog today! Ask about free Lab Testing Plan.

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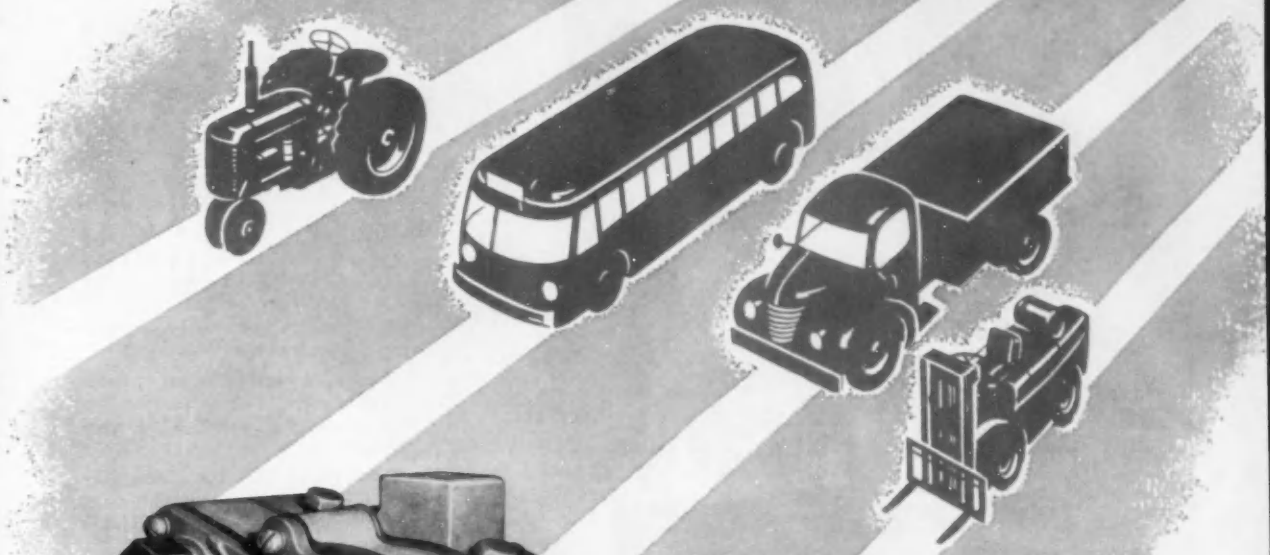
MANUFACTURING

These "BOTTLE" Babies Cut Costs on Man-Size Jobs



Marvel-Schebler LPG vaporizer-regulator for trucks, tractors and industrial engines

...thanks to BORG-WARNER LPG carburetion

Tractors, trucks, buses, industrial engines... "bottle" babies all . . . and what blessed events for cost-conscious management!

"Bottle" babies? Right! They're formula-fed on "bottled" Liquid Petroleum Gas . . . through precision-built Borg-Warner carburetion systems.

A high-octane, anti-knock fuel that burns with a clean, practically odorless exhaust, LPG gives instant starts—doesn't dilute oil—leaves almost no carbon—deposits no lead salts—and virtually eliminates 100% of the sludge and varnish that gum up vital engine parts.

No wonder LPG users report up to 85% reduced oil consumption—twice the mileage between major overhauls—spark plugs still good after 4 years' use . . . and countless other examples of costs cut to the bone.

Borg-Warner's Marvel-Schebler Products Division pioneered carburetion right from the start. Today, Marvel-Schebler original equipment and LPG conversion kits may be found serving transportation, industry and agriculture throughout the nation.

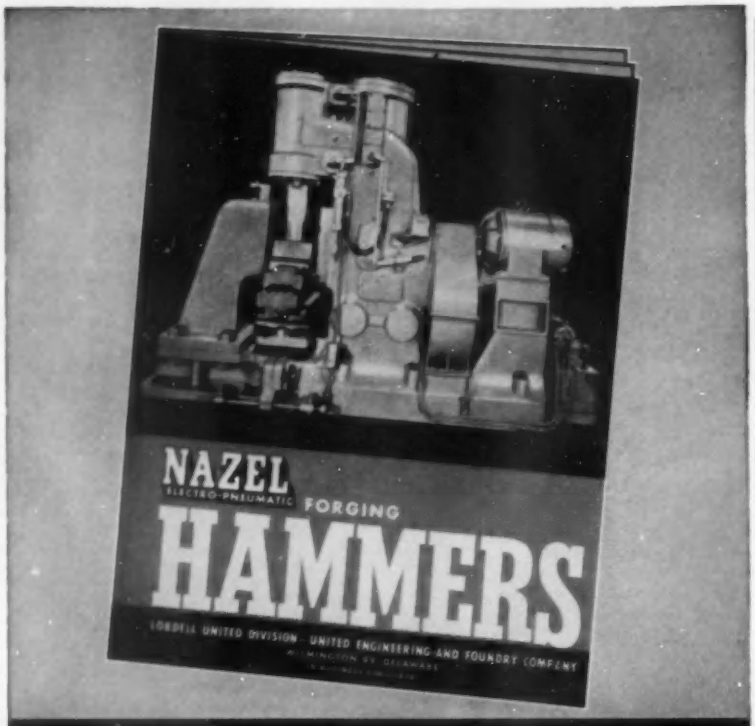
Built to extract the maximum economies inherent in LPG fuel, these carburetion systems are the finest available.

B-W ENGINEERING MAKES IT WORK B-W PRODUCTION MAKES IT AVAILABLE

Almost every American benefits every day from the 185 products made by

BORG-WARNER

THESE UNITS FORM BORG-WARNER, *Executive Offices, 310 S. Michigan Ave., Chicago.*
DIVISIONS: ATKINS SAW • BORG & BECK • CALUMET STEEL • DETROIT GEAR • FRANKLIN STEEL HYDRALINE PRODUCTS • INGERSOLL CONDITIONED AIR • INGERSOLL KALAMAZOO • INGERSOLL PRODUCTS INGERSOLL STEEL • LONG MANUFACTURING • MARBON CHEMICAL • MARVEL-SCHEBLER PRODUCTS MECHANICS UNIVERSAL JOINT • NORGE • PESCO PRODUCTS • ROCKFORD CLUTCH • SPRING DIVISION WARNER AUTOMOTIVE PARTS • WARNER GEAR • WOOSTER DIVISION • **SUBSIDIARIES:** BORG-WARNER ACCEPTANCE CORP. • BORG-WARNER INTERNATIONAL • BORG-WARNER, LTD. • BORG-WARNER SERVICE PARTS LONG MFG., LTD. • MORSE CHAIN • MORSE CHAIN OF CANADA, LTD. • REFLECTAL CORP. • WARNER GEAR, LTD. WAUSAU MFG. CO. • WESTON HYDRAULICS, LTD.



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TELLS ALL ABOUT

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The new, 20 page NAZEL Hammer Catalog gives the reasons why NAZEL is the world's most widely used Electro-Pneumatic Hammer. One of the reasons is because NAZEL Electro-Pneumatic Forging Hammers are *completely self-contained* . . . do *not* require compressors, boiler, piping, nor fuel. Just the "touch of a button" and the NAZEL is ready to operate . . . and a press of the foot-treadle for the lightest to heaviest ram blow.

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LOBDELL DIVISION

UNITED ENGINEERING AND FOUNDRY COMPANY

1836 WILMINGTON 99, DELAWARE 1955

MEN *in the* NEWS

(*Continued from page* 150)

R. L. Polk & Co.—Walter J. Gardner has been appointed executive vice-president and general manager of the operating divisions of the company.

Robertshaw-Fulton Controls Co.—**R. S. Reynolds, Jr.**, was recently elected chairman of the board. **J. Louis Reynolds** and **John A. Robertshaw, Jr.**, were named directors.

Electric Storage Battery Co., Exide Industrial Div. — **Ervin Seltzer** has been appointed manager of industrial engineering.

Ford Motor Co., Metal Stamping Div. — **John B. Kendall** has been named manager of the Chicago stamping plant.

Hamilton Div., Baldwin-Lima-Hamilton Corp. — **John Cameron** has been named assistant chief engineer for Hamilton mechanical presses.

Chevrolet Motor Div., General Motors Corp.—**Ralph D. Forshee** is now manager of the new truck assembly plant at Willow Run, Mich.

New Process Gear Corp.—**Van S. Wielosinski** has become chief metallurgist.

Goodyear Tire & Rubber Co.—**Harold D. Cunningham** has been promoted to general traffic manager.

Mercury Div., Ford Motor Co.—**J. J. Kaye** was named manager of the Mercury assembly plant at Wayne, Mich.

Consolidated Engineering Corp., Systems Div.—**Albert W. Brandmaier, Linden G. Criddle**, and **Jack K. Walker** were promoted to principal engineers.

Kellet Aircraft Corp.—**Paul E. Hovgard** has been appointed director of research and development.

Parker Appliance Co.—**Walter A. Keller** was made purchasing agent, and **Kent Hawkins**, staff engineer for the Engine Accessories Div.

Chrysler Corp.—**Robert M. Meadows** was chosen superintendent of planning for the Nine Mile Press plant.

Lockheed Aircraft Corp., Missile Systems Div.—**Louis N. Rideneur** is now director of program development.

When fast starts mean lives or dollars –

Globe batteries provide starting punch...

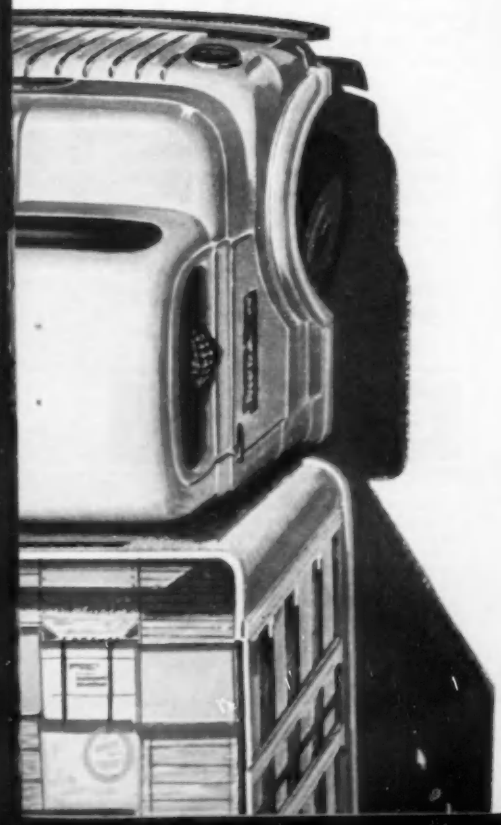
INSTANTLY!

The battery performance so vital in emergencies . . . so important to profits for heavy machinery users . . . always pays off in automotive equipment! Globe batteries are built for the job, and do the job better. Every Globe battery is the result of continuous product research and development . . . plus the finest, most scientific methods of manufacture.

Each Globe battery produced has the advantage of 47 years of battery-engineered experience, is backed by 33 years of building batteries specifically for trucks, heavy machinery, army tanks and automobiles. And every battery produced by Globe shows the results of this experience.

For reliability . . . for durability . . . Globe batteries are unsurpassed by any batteries made. Performance records prove they stand up long, through rugged working conditions and roughest weather. They prove that every Globe battery is packed with reserve power to keep an engine "spinning" until it starts.

To get the finest batteries your money can buy, always specify Globe batteries. Users everywhere acclaim Globe batteries and know—from their own experience — that Globe batteries are built better to serve better!



GLOBE-UNION INC.

MILWAUKEE 1, WISCONSIN

FOR FAST SERVICE THERE ARE 16 GLOBE BATTERY PLANTS — ATLANTA, GA. • BOSTON, MASS. • CINCINNATI, OHIO • DALLAS, TEXAS • EMPORIA, KANSAS • HASTINGS-ON-HUDSON, N. Y. • HOUSTON, TEXAS • LOS ANGELES, CALIF. • MEMPHIS, TENN. • MILWAUKEE, WIS. • MINERAL RIDGE, OHIO • OREGON CITY, ORE. • PHILADELPHIA, PA. • REIDSVILLE, N. C. SAN JOSE, CALIF. • AJAX (TORONTO) CANADA.

if it's petroleum-powered *there's a*

GLOBE-BUILT BATTERY

... right from the start

The Business Pulse

(*Continued from page* 106)

manufacturers' level.

There is every prospect, moreover, that business investment in plant and equipment will continue on the upgrade over the rest of this year. A joint estimate by the Department of Commerce and the Securities and Exchange Commission puts fourth-quarter spending for such investment goods at a seasonally adjusted annual rate of $29.73 billion, $700 million higher than the estimated rate in the third quarter.

Coupled with these rising tendencies is the prospect that other major sectors of the economy will continue at least as active in coming weeks as in the recent past. Approximate stability, for example, is indicated in construction, where we seem to be witnessing offsetting tendencies in residential and non-residential activity, the former receding slightly while the latter rises. Government outlay also appears unlikely to show any decided directional movement over the near term, now that Federal retrenchment is apparently approaching an end for the time being. While it is always hazardous to try to forecast consumer spending, it can at least be said that nothing has occurred of late which suggests any lessening of the pronounced willingness to buy that has typified behavior so far this year.

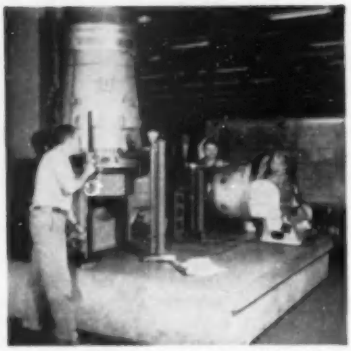
Modest Gains

These tendencies, in combination, suggest some further increase in overall business volume by the end of the year. But, in view of the fact that there appears to be very little slack left in the economy, it seems evident that further gains, if they do in fact occur, will be of modest proportions in real terms. Not only are many raw materials in decidedly short supply at present, but bottlenecks caused by shortages of labor are being reported with increasing frequency. Thus, from here on, increases in business volume are likely to be pretty much limited by the normal growth factors of productivity and growth of the labor force. This suggests a rate of growth less than half that which has prevailed since the business upturn got under way last autumn.

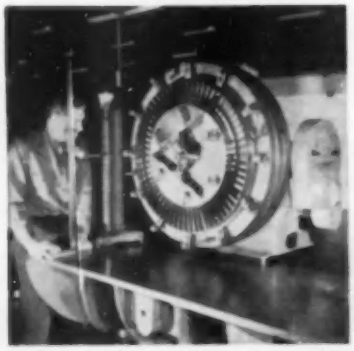
The cost-price squeeze on both manufacturers and distributors throughout the economy, moreover, has unfavorable implications for the profit picture that cannot be ignored, and there is the perennial question, especially pointed just now, whether indebtedness has advanced too rapidly. In addition, there remain doubts as to the wisdom and efficacy of monetary policy that will not be resolved until many months have passed, if then. Finally, there is the new uncertainty caused by the President's illness. So far it is impossible to do more than guess at the probable repercussions of this untoward occurrence on consumer and business attitudes.

ROTABS Beat Precision Inspection Costs...

This 24" ROTAB plus centering fixture cuts checking time for 11 dimensions on six vane segments from several hours to 5 minutes each.



Checking big jet engine assemblies is fast and simple on ROTABS (36" & 48"), eliminates costly fixtures made obsolete by engineering changes.



Seconds-of-arc precision allows quick, accurate inspection with low cost standard gages. Here 36" powered unit checks vane spacing.

For small parts inspection this 12" universal ROTAB minimizes setup and inspection time, does not require power for tilting and rotation.

For complete data on the optical precision readings you get with the ROTAB at the lowest cost, write:

MACHINE PRODUCTS CORP.
6771 East McNichols Road Dept. A DETROIT 12, MICH.

BOOKS...

HOT CAM HANDBOOK, *published by Frank Morgan Co., Marysville, Calif. Price, $1.00.* This booklet was written with the purpose of aiding those who want to understand the effect of valve timing on modified engines; and also to help those who want to build modified engines, yet who have not been able to work with experienced people in the field. Although it is not comprehensive, it gives much of the underlying detail which is not generally known.

BIG PRESSES FOR DIE TRYOUT- AVAILABLE NOW!

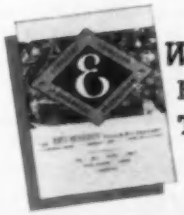
At EFFICIENT every die or tool we build is tested on our own large, modern tryout presses. These presses range up to 1,100 tons capacity (both single and double action presses) with bed dimensions as large as 84" front to back, and 148", right to left, shut height of 84", stroke 34".

After developing and testing of dies, sample parts are produced for your approval. You have no tryout problems because . . .

EFFICIENT *Tooling* is *"Press-Proved"*

The tryout presses illustrated are typical of the equipment housed in EFFICIENT'S modern plants covering 55,000 sq. ft.

EFFICIENT has the machines, the men, the technical know-how and experience to meet your tooling requirements. Large, complex difficult dies are built and "press-proved" in our plant . . . to save production headaches in your plant.



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For Free Bulletin or Tooling Consultation

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The MOST USABLE OF ALL AIR GAGES

CHARACTERISTICS

High precision with instant response

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Has widest amplification range — 100 to 100,000-1

•

Accommodates widest tolerance range — .000005 to .100

•

Amplifications and tooling interchangeable

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Provides quickest change in amplification

•

Longer scale facilitates classifying parts and provides greater approach range

•

Easier to read — no need to squat and squint

•

Human error minimized

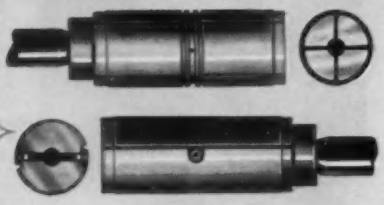
•

Checks one dimension or many simultaneously

•

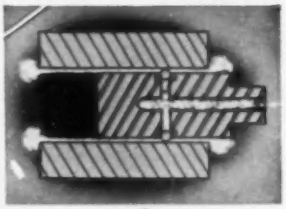
Elements have long service life

BASIC INTERNAL TOOLING ELEMENTS

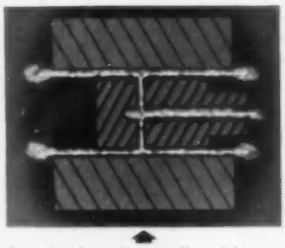


AIRJET SPINDLE

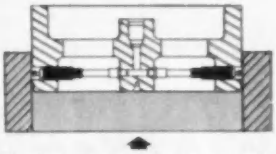
For True Diameter



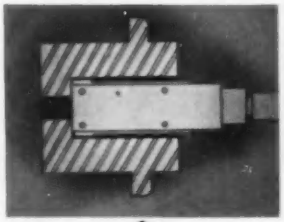
Balljet Spindles used for holes in porous or soft materials and for internal surfaces rougher than 65 rms.



Standard stock spindle with two diametrically opposed open jets for holes having tolerances of .005" or less and surface finishes of less than 65 rms.

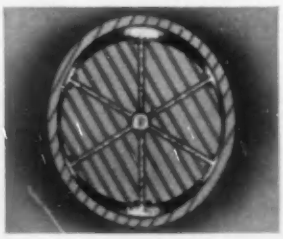


Plunjets mounted in a suitable fixture are used for larger holes and those having larger tolerances.



Bladejet Spindles are used in interrupted bores, bores having a keyway, to gage to the very bottom of a blind bore and for larger tolerance bores.

Adjustable spindles and kits are available to cover ranges of ⅜" to ⅞"; ⅞" to 1½"; 1" to 3"; 1½" to 3" and 3" to 12".



For Average Diameter

Spindles having three or more jets equally spaced around the perimeter—especially effective in checking thin wall components.

7210

MORE PRECISIONAIRES BOUGHT . . . . . .

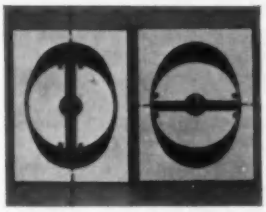
Learn About Holes*

BALLJET SPINDLE

BLADEJET SPINDLE

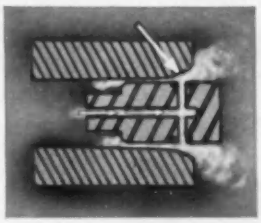
PLUNJET CARTRIDGES

For Out-of-Round



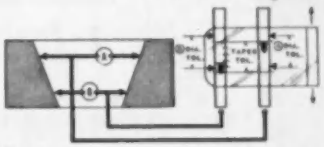
Indicated when any spindle is rotated through 90 degrees.

For Bell-Mouth



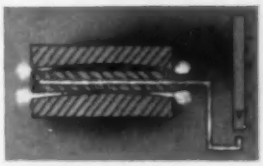
Indicated as any spindle enters or is withdrawn from the bore.

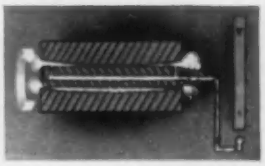
For Taper



Indicated as any spindle is passed through the bore. Spindles having two or more sets of jets may also be used. In larger bores and/or those having larger tolerances, Plunjets in a suitable fixture are used.

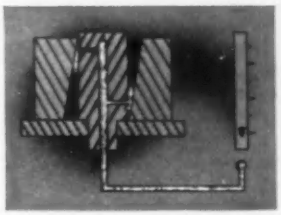
For Camber

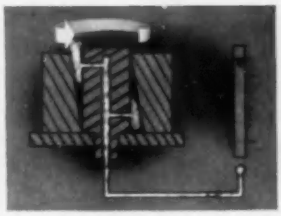


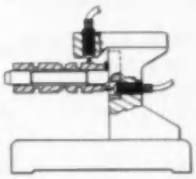


Camber or straightness of a hole is checked by rotating through 180° a spindle having four jets as indicated.

For Squareness of a Bore Axis with a Face



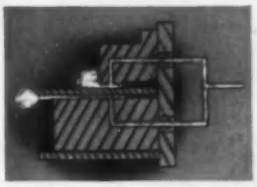




Spindle with opposed open orifices spaced longitudinally checks squareness of a bore axis with a face.

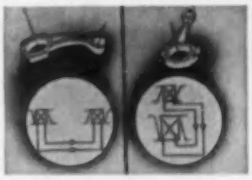
Plunjet fixtures may also be used.

For Concentricity



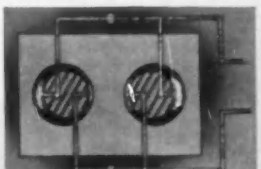
Opposed jets in a locating fixture.

For Parallelism of Holes



By integrating two spindles in a fixture, such as those used for squareness checking.

For Center Distance Between Holes



By a fixture with two spindles each having two opposed jets.

*For checking external dimensions, relationships and countless other conditions, write to Div. 600, **THE SHEFFIELD CORPORATION, Dayton 1, Ohio, U.S.A.**

SHEFFIELD HEADQUARTERS

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MANUFACTURE AND MEASUREMENT FOR MANKIND

THAN ALL OTHER MAKES OF AIR GAGES

NOW!

OVER 600

Original Equipment Manufacturers

are installing

MARVEL SYNCLINAL FILTERS

as Standard Equipment!

This figure represents manufacturers of all types of production equipment and components of equipment utilizing hydraulic and other low pressure circulating systems.

We are extremely proud of this figure as a whole, and we take great pride in the fact that it still includes those who selected MARVEL SYNCLINAL FILTERS as standard equipment in our first year of operation over 12 years ago.

AND—THE NUMBER INCREASES STEADILY WEEK BY WEEK!

SUMP TYPE
(cutaway)

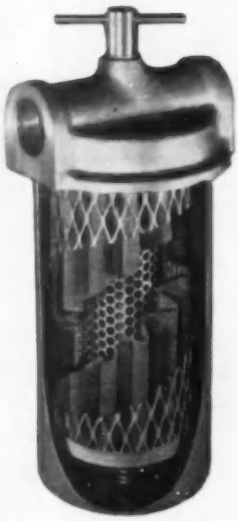
For Dependable Protection on all Hydraulic and other Low Pressure Circulating Systems, and
For Efficient Filtration of Hydraulic Oils, Fire-resistant Fluids, Coolants, Lubricants and Water—

Investigate

MARVEL SYNCLINAL FILTERS

They Meet

J. I. C. Standards



LINE TYPE
(cutaway)

A SIZE FOR EVERY NEED

Available for Sump or line installation in capacities from 5 to 100 G.P.M. Greater capacities may be attained by multiple installation (as described in catalog). Choice of monel mesh sizes range from coarse 30 to fine 200.

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Both sump and line types may be easily disassembled, thoroughly cleaned and reassembled by any workman, on the spot, in a matter of minutes. Line type operates in any position and may be serviced without disturbing pipe connections.

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Catalogs containing complete data available on request

AI-10

Without obligation, please send me complete data on Marvel Synclinal Filters, as follows:—

- ☐ Catalog #106—For Hydraulic Oils, Coolants and Lubricants
- ☐ Catalog #300—For WATER
- ☐ Data on filters for Fire-resistant hydraulic fluids.

Name .....

Title .....

Company .....

Address .....

City .....

State .....

Industry News

(*Continued from page* 104)

Parish Expansion Program To Include New Machinery

The multi-million dollar expansion program being undertaken by Parish Pressed Steel Division plant of Dana Corp. at its Reading, Pa., plant (see AI, Oct. 1, p. 37) will involve construction of two additions to the present plant. One will be 560 ft long by 180 ft wide, and the other will be 180 ft long by 90 ft wide. The two additions will total 173,000 sq ft in area.

The larger of the two new buildings will house some of the most modern automotive frame fabricating machinery available. One piece of equipment, for example, will be an underdrive Bliss press of 2400-ton capacity capable of forming truck side rails up to 30 ft long in one stroke.

In addition, the facility will house 19 other presses ranging in capacity upward from 150 tons.

The large building will be laid out in two bays. The east bay, running north and south, will house a new assembly line for producing either Oldsmobile or Buick frames. Facilities are designed so either type frame can be placed in the line, provided proper fixtures are available. All of the new presses will be installed in the west bay.

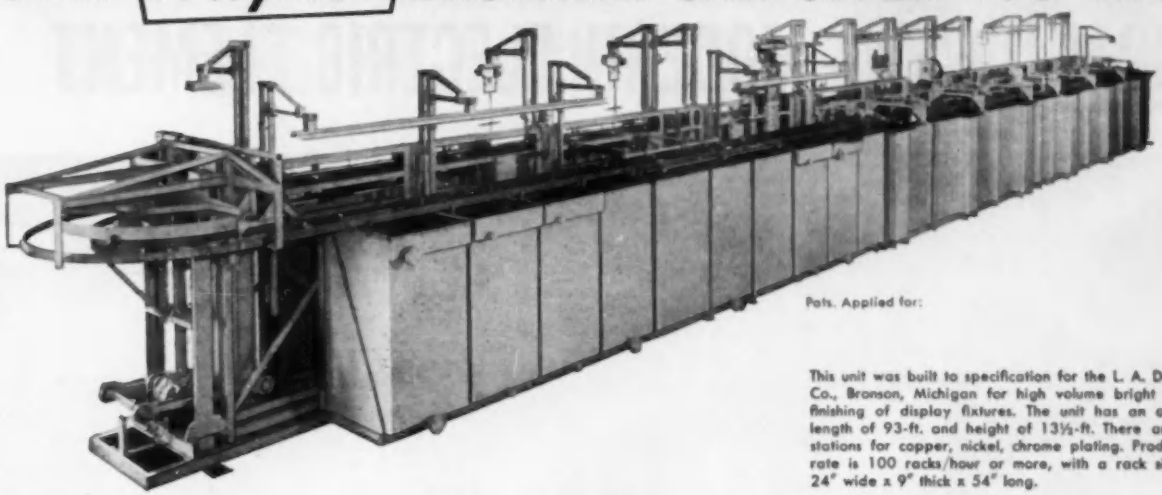
Smaller of the two buildings will house an advanced type painting machine. Frames coming off the assembly line will be moved to the machine on conveyors, picked up, washed, and painted automatically, then baked at 325 deg in an automatic oven. Next, they will be laid down on another conveyor completely finished and ready for loading in freight cars.

Timken Earmarks $12 Million Fox Expansion in Next Year

Timken Roller Bearing Co. plans to spend $12 million next year to expand and modernize facilities. Biggest portion of the outlay, about $7 million, will go for the purchase of automatic screw machines and grinding equipment for all plants, modernization of the company's tube mill near Canton, O., construction of a warehouse at the Bucyrus, O., plant, and erection of an oxygen plant. The remaining $5 million will go for increased production of railroad bearings.

(*Turn to page* 192, *please*)

ONLY Wagner BROTHERS CAN OFFER YOU THIS

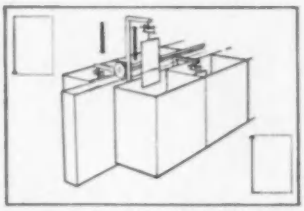


Pats. Applied for:

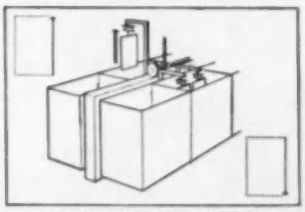
This unit was built to specification for the L. A. Darling Co., Branson, Michigan for high volume bright metal finishing of display fixtures. The unit has an overall length of 93-ft. and height of 13½-ft. There are 27 stations for copper, nickel, chrome plating. Production rate is 100 racks/hour or more, with a rack size of 24" wide x 9" thick x 54" long.

Revolutionary Concept in plating automation...

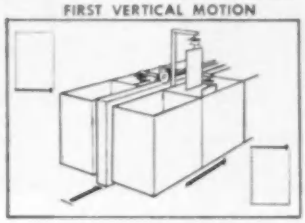
The Wagner Brothers Automatic is a complete and fully automatic mechanism, incorporating a revolutionary vertical transfer and return type work conveying principle which eliminates elevating superstructure, transfer cams, chains and sprockets and hydraulic cylinders above tanks. Many unique design features combine to make this mechanism a smooth operating, perfectly timed unit requiring less than ½ the power of comparably sized units.



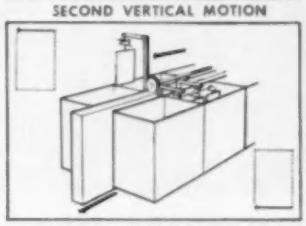
FIRST VERTICAL MOTION



SECOND VERTICAL MOTION



FIRST HORIZONTAL MOTION



SECOND HORIZONTAL MOTION

HOW IT WORKS

All transfer and conveying mechanism is mounted on a reciprocating carriage located between the two rows of tanks. Two basic movements are used to bring parts through the full plating cycle; one forward and reverse straight line horizontal motion and one raising and lowering vertical movement.

Plating racks are attached to work-carriers at the loading station. When the machine is started, lifting arms fixed to the carriage engage the work-carriers being transferred and lift them at all transfer points on one side of the machine, carry them forward to the next station where they are lowered and disengaged from the lifting arm. This sequence is simultaneously produced in reverse on the opposite side so that, when the lifting arms are being lowered on one side, they are raised on the other side.

ADVANTAGES

SMOOTH OPERATION—Operates so smoothly that you can balance a full water glass on the transfer mechanism throughout the entire plating cycle. Obviously such smooth operation will save you time now spent salvaging parts from tanks; dropped there because of the jolting transfer action of ordinary machines. This smooth, positive performance is accomplished because of our hydromator principle which makes each start and stop gentle as a breeze.

LOW POWER REQUIREMENTS—Powered by one 10 hp motor, this installation uses less than half the power required by comparably-sized units. This is possible because of the almost perfect balance of work load being lifted at one time.

SIMPLE INSTALLATION—Your Wagner Brothers Automatic is delivered to you, either intact or in two or three completely assembled sections, depending upon size. Installation is simply a matter of positioning and leveling.

MINIMUM OF MAINTENANCE—There are few moving parts to wear, no vibrating parts, no backlash in automation, nor little chance of misalignment. Overload protection is given by a by-pass in the hydraulic pump. All working parts can be reached for adjustment without disassembly.

OTHER PLUS FEATURES—Wagner Brothers Automatics require a minimum of space. The model illustrated uses 54-inch racks and operates under a 13½-ft. ceiling. There are no greased parts or hydraulic fittings over tanks where dripping oil could contaminate solutions. Triple contacts on cathode bars afford consistent, uninterrupted current flow. Automatic heat control system gives simple, foolproof regulation of temperature for accurate results. Centralized lubrication can be provided as an optional feature. Drag and dwell times are easily varied with this unit. **Write for free, illustrated folder.**

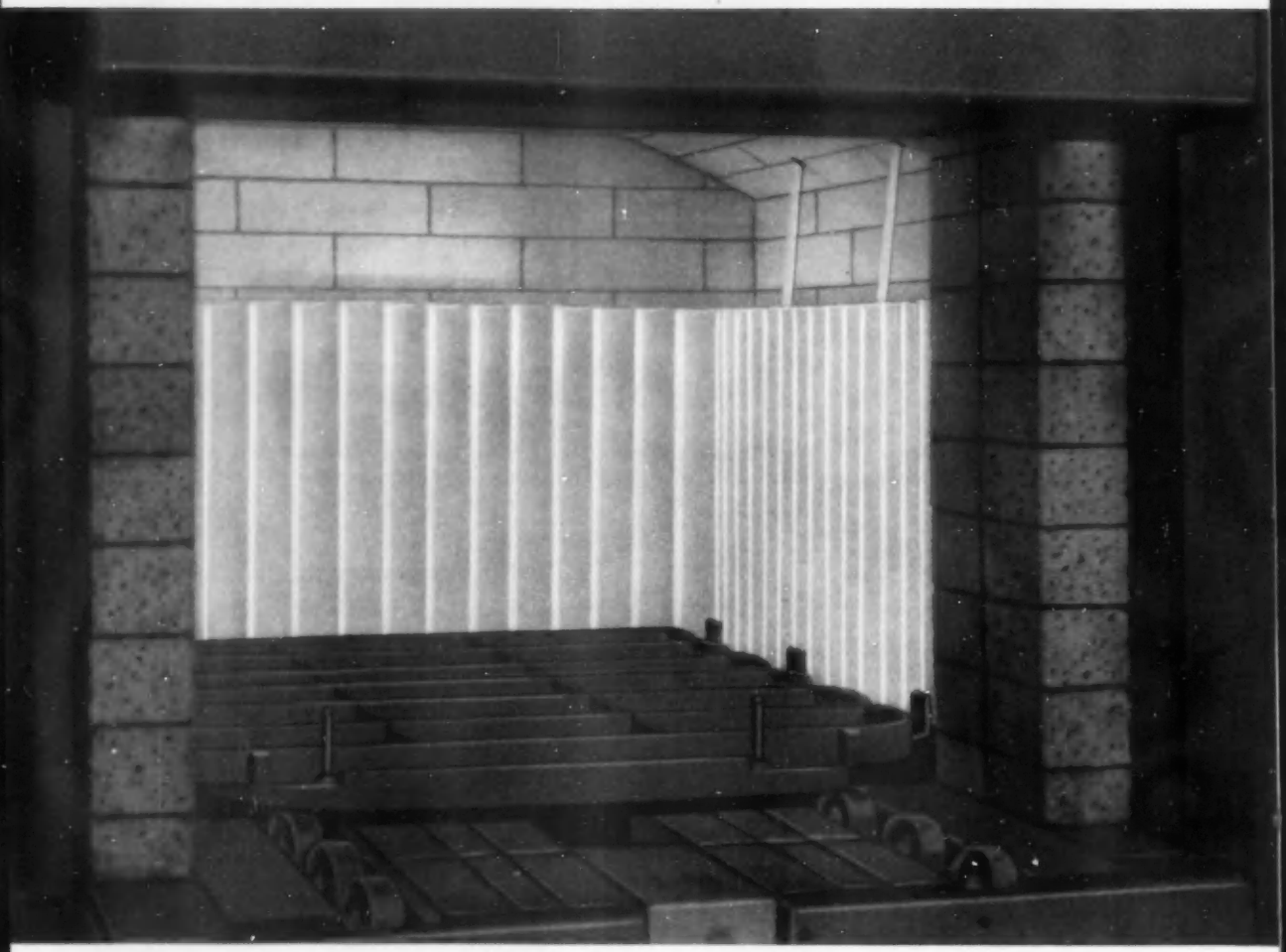
In addition to high-volume plating, the Wagner Brothers' Automatic is equally well-suited to anodizing (sulphuric and chromic), phosphate coating, etching, electropolishing, oxide coating.

YOUR PRIMARY SOURCE FOR PLATING AND POLISHING EQUIPMENT AND SUPPLIES

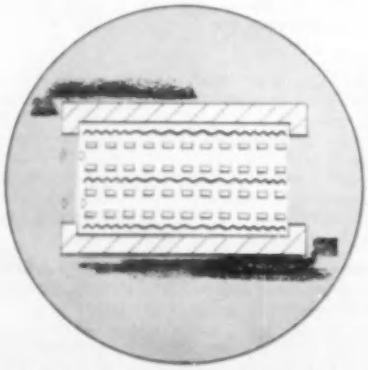
Wagner BROTHERS, INC.

437 MIDLAND AVE. • DETROIT 3, MICHIGAN

BRAND NEW–MODERN ELECTRIC ELEMENT

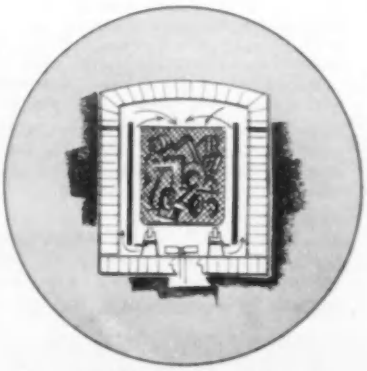


This shows graphically how the new Lindberg CORRTHERM electric heating element actually fills the furnace with walls of glowing heat. Note also that CORRTHERM is conveniently hung from simple brackets requiring no complicated connections or construction. This element operates at extremely low voltage, eliminating shock or short hazards.



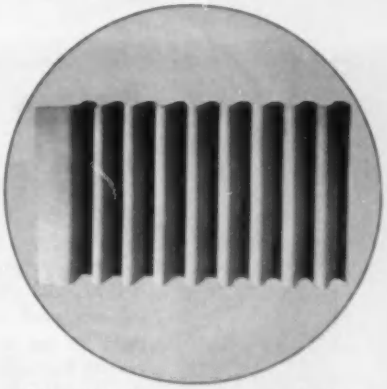
In continuous type furnaces CORRTHERM elements hang between lines of work as well as on side walls. Note how closer corrugations (at each end of element) compensate for incoming cold work and door losses.

CORRTHERM elements act as natural baffles to direct forced convection streams through the charge. The use of electric furnaces for carburizing and carbonitriding now becomes completely practical.



No retort needed in pit-type carburizing furnace with CORRTHERM elements. Again see how elements serve as baffles to direct forced convection stream through charge.

FOR LINDBERG FURNACES



CORRTHERM elements are large sheets of corrugated nickel chromium. They were developed in Lindberg laboratories by Lindberg metallurgists and engineers.

Never before has there been an electric heating element like this CORRTHERM by Lindberg. Its revolutionary advantages now make the use of electricity as the source of heat, practical, efficient and economical for all heat treating processes.

Ideal for use in any electric heat treating furnace, CORRTHERM elements have particular advantages for carburizing and carbonitriding. This new element completely eliminates problems formerly created by the use of electricity in these types of furnaces. These exclusive advantages of CORRTHERM explain how and why:

LOW VOLTAGE: Operates at extremely low voltage. No leakage through carbon saturation. Around Lindberg we talk about it as the electric element "without any electricity . . . to speak of!"

ATMOSPHERE CIRCULATION: Elements act as baffles to direct circulation of convection streams.

SAFETY: Extremely low voltage also eliminates shock or short hazards.

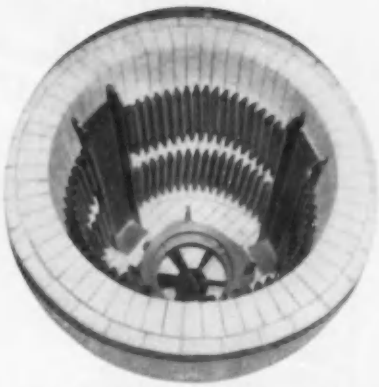
DURABILITY: Watts density at all-time low. Element practically indestructible. Work load or operator's charging tool can't hurt it.

EASILY INSTALLED: Element is not enclosed, just hangs in furnace. No complicated mountings required.

If electricity is the preferable source of heat for your metal treating processes find out how advantageously CORRTHERM elements can be applied to your requirements. Just get in touch with your nearest Lindberg Field Representative. (Consult your classified phone book.)

This shows installation of CORRTHERM elements in one of two large rotary furnaces currently being erected in the field by Lindberg's associate company, Lindberg Industrial Corporation.

See CORRTHERM at ASM Show. The new CORRTHERM element will have its first public showing at the ASM Show in Philadelphia, October 17 to 21. Plan to see this and many other new developments by Lindberg in the furnace and related fields in the Lindberg Booth No. 230.



An installation of CORRTHERM elements in a carburizing pit-type furnace. Simplicity of mounting makes replacement easy and economical.

LINDBERG ENGINEERING COMPANY

2491 West Hubbard Street, Chicago 12, Illinois
Los Angeles Plant: 11937 Regentview Ave., at Downey, California

Safety! Extremely low voltage makes CORRTHERM elements completely safe. Let operator or work load bang it if they will. Neither element nor operator will be hurt.

CORRTHERM

by LINDBERG

two years 'til tomorrow...

. . . may sound odd. But for the engineers, tomorrow is 1957. Today they are developing, testing and tooling new products and new models for introduction then. It's not too soon because the necessary engineering for success takes time.

Deadlines don't stand still for excuses. If your engineering staff is overloaded, or doesn't have the experience to meet tomorrow's deadline, then Pioneer Engineering stands ready to aid you.

Regardless of the size of your job, or its location, we can provide you with a single engineering source with years of experience, proven ability and adequate facilities to meet your deadline. Call today or write for Bulletin PE-25. No obligation, of course.

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Here's What DEVELOPED BY GOSHEN RUBBER means to you...

Finest facilities and technical know-how are constantly at work compounding materials, and fabricating custom-designed parts that must resist temperature extremes; oils, chemicals, acids; severe friction, swell or stretch . . . in short, the exact conditions your product must endure.

On your next rubber part, consult Goshen

make GOSHEN *your* HEADQUARTERS *for*

DISCS
SEALS
O-RINGS
PACKINGS
DIAPHRAGMS

AND CUSTOM DESIGNED

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Goshen Rubber Co. INC. *Goshen, Ind.*
CUSTOM DEVELOPMENT AND FABRICATION SINCE 1916
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GET GOING WITH GOSHEN

Industry News

(*Continued from page* 188)

Volkswagen Head Outlines Plans for U.S. Operation

Speaking at a luncheon held early this month near the company's recently purchased manufacturing plant in New Brunswick, N. J., Prof. Heinz Nordhoff, director general of Volkswagen, stated that the Budd Co. would probably supply certain major body components for Volkswagens to be assembled in the U.S. Volkswagen is a foreign licensee of several Budd developments.

Volkswagen is said to be planning on a daily production rate of about 250 cars by October, 1956, at its new facility here. No firm commitments have been made yet for tools, Prof. Nordhoff said. Although engines will continue to be shipped from Germany for the time being, Volkswagen is attempting to locate a builder here.

Operations at the New Brunswick plant are to be confined to machining and assembly work. Local labor will be hired, but a few German specialists will hold supervisory positions for a while.

Other Volkswagen plans for its new American operation include the setting up of a strong parts organization. Conceived as a separate subsidiary of the parent German concern, the new Volkswagen operation in this country may be capitalized by the floating of a stock issue.

Firestone Ups Output; Will Build New Plant

Another increase in production capacity for synthetic rubber is being planned by Firestone Tire & Rubber Co. It will also construct a new plant for production of butadiene.

Output at the Akron synthetic rubber plant will be boosted about 35 per cent to bring the annual production rate to 40,000 tons. The butadiene plant also will have a 40,000-ton-a-year capacity. Location of the new plant has not been given.

Peters-Dalton Bought By Detroit Harvester

Peters-Dalton Co. has been purchased by Detroit Harvester Co., and will now operate as a wholly-owned subsidiary of the latter firm. A manufacturer of spray booths, washers, and ovens, Peters-Dalton has been doing a $10 million annual business.

FRONTIER 40-E Aluminum Alloy

Improves with Age

FRONTIER 40-E Aluminum Alloy			
TIME AGED	YIELD STRENGTH	TENSILE STRENGTH	ELONGATION
21 days	25,440	34,400	5.1
2 years	31,300	39,300	4.5
2½ years	30,650	39,050	4.5
3 years	29,400	37,900	4.0
4½ years	30,075	38,000	3.75
8 years	31,550	37,025	5.5

The above figures were derived from 12 sample casts made over a period of 8 years. Figures shown are the average of all the samples in each group.

As shown in the table at the right, castings made of Frontier 40-E Aluminum Alloy grow stronger as they age without brittleness or loss of elongation. Yes, parts made of Frontier 40-E actually grow stronger while in use! Frontier 40-E is the outstanding high-strength aluminum alloy, due to a unique metallurgical formula. Frontier 40-E is an aluminum alloy containing zinc with magnesium, titanium, and chromium as added ingredients that result in great strength and absence of brittleness without special and costly heat treatment. It has been proven by extensive tests that "40-E" reaches stability at room temperature. After this stabilization has taken place there is little further change either to increase or decrease physical values. Frontier 40-E Aluminum Alloy is also Shock Resistant; Corrosion Resistant, even under stress; has excellent machineability; is fine grained for Pressure Tightness.

Technical advice and service is available to designers and licensees.

Please send me a copy of the Alloy Data Book giving engineering and metallurgical facts on the physical properties of Frontier "40-E".

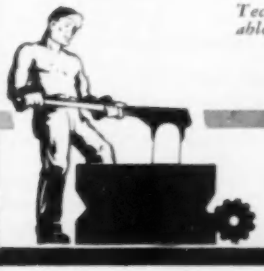
Name .....

Company .....

Address .....

City .....

State .....



FRONTIER BRONZE CORPORATION

4885 PACKARD ROAD, NIAGARA FALLS, NEW YORK

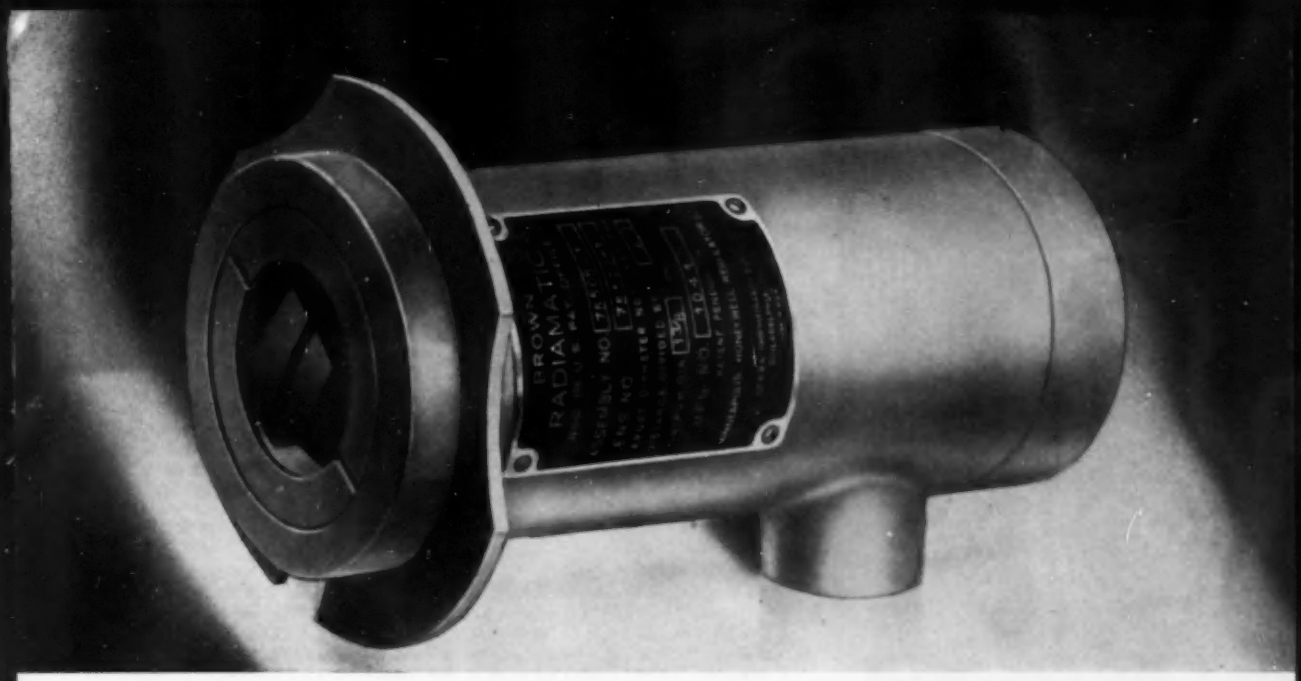
New Radiamatic

PYROMETER

catches any temperature

Compare these performance features—

Fast response speed	0.4 seconds for 98% change in temperature.
Ambient temperature compensation	automatic for temperatures up to 250F.
Distance factor	both narrow angle and wide angle types available for various target sizes.
Choice of ranges	800 to 1900F. or 1000 to 2600F.
Instrument	*ElectroniK* potentiometer with 1-second full scale response.
Simple mounting	compact unit is readily installed with standard hardware, same as general purpose *Radiamatic*. Rear sighting window is available to assist installation.



change in less than 1/2 second

. . . adds new areas of application to the realm of pyrometric measurement

Got fast-changing temperatures to measure or control?

This latest model of the *Radiamatic* pyrometer is what you need. Its split-second response brings a new level of speed and accuracy to a whole host of vital temperature measurements.

- **In rolling operations,** it catches temperatures of fast-moving bars, billets and sheets . . . follows temperatures so faithfully that it can get you accurate distribution curves along the length of the piece being rolled.
- **In heating operations** the new *Radiamatic* element makes possible precise, automatic shut-off of fuel or power in high-speed heating . . . the instant that critical temperatures are reached.

The secret of this unusual performance is a new kind of design, that puts the principle of radiation pyrometry to work at higher speed than ever before. 98% of any temperature change is detected in less than one-half second!

In precision, too, the new design excells. Sudden changes in ambient temperature, due to drafts, opening of furnace doors and the like, won't introduce errors in measurement. The unit can be mounted in "hot spots," where ambient temperatures get as high as 250F., without affecting its calibration.

The instrument that works best with the *Radiamatic* element is a high speed *ElectroniK* recorder, which can be supplied with a wide variety of signalling and controlling functions. For a discussion of how you can utilize this new standard of measuring performance in your own production, call your local Honeywell sales engineer . . . he's as near as your phone.

Minneapolis-Honeywell Regulator Co., *Industrial Division*, Wayne and Windrim Avenues, Philadelphia 44, Pa.—in Canada, Toronto 17, Ontario.

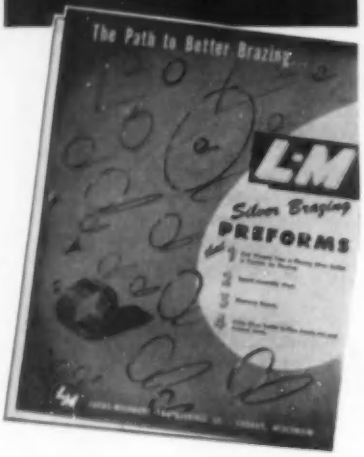
● **REFERENCE DATA:** Write for Bulletin 9320, "New High Speed *Radiamatic* Detector."

H HONEYWELL

MINNEAPOLIS
Honeywell
BROWN INSTRUMENTS

First in Controls

IF Silver Brazing IS PART OF YOUR PRODUCTION



You'll Need This Helpful 10 Page Reference Book

Here's a 10 page booklet that gives you all the information you need on the advantages and use of Silver Brazing Preforms.

- Gives you complete information on No Tangle-Notch Coil Rings, how they increase production, save time and labor in handling alloy.
- Helps you select the proper preform for the job. Contains charts that illustrate the type joint, recommended preform and simple ordering data.
- Gives the complete line of coined and blanked washers, and silver brazing and soldering alloys available.
- Helps you get quick, accurate alloy calculation with calculating tables for all commonly used alloys.

Send for FREE Copy Today!

LUCAS-MILHAUPT ENGINEERING CO.
3055 So. Lake Drive Cudahy, Wisc.
(Suburb of Milwaukee)

AI TABLOID

(Continued from page 37)

Goodyear Tire & Rubber Co. has launched a sizeable expansion of its Houston, Tex., facilities.

* * *

The Plastics Dept. of Rohm & Haas Co. has moved its Detroit office to the Nor-Way Bldg. . . . Torrington Co. has moved its New York offices to the Port Authority Bldg.

* * *

United-Carr Fastener Corp. has acquired Graphik-Circuits and Plastic Process Co. . . . Hall-Scott Motors Co. has acquired Dynamic Analysis Co.

* * *

British Oxygen Co., Ltd., and Aro Equipment Corp. have announced the formation of a new company, British Oxygen-Aro Equipment, Ltd.

* * *

Rem-Cru Titanium, Inc. has announced the purchase of a group of five buildings and ten acres of land in Midland, Pa., as another step in its expansion program.

* * *

General Electric Co. has assigned responsibility for commercial development of the process for manufacturing man-made diamonds to the Carboloy Dept.

* * *

W. O. Barnes Co., Inc. has completed a 9000 sq ft addition to its present plant.

* * *

Republic Steel Corp. has announced plans to increase its steel making capacity by 16 per cent.

* * *

Murray Corp. of America has completed sale of inventory, plant, and equipment in its Frame Div. plant at Ecorse, Mich. to Dana Corp.

* * *

U. S. Hoffman Machinery Corp. has acquired Aerolab Development Co. . . . Arrowhead Rubber Co. subsidiary of National Motor Bearing Co., Inc., has purchased the Bellows Div. of Airite Products Co. . . . Willson Products has purchased the assets of Paramount Plastics Co. and Paramount Rubber Co.

Society of Industrial Designers has voted to change its name to American Society of Industrial Designers.

* * *

Fafnir Bearing Co. will construct a 160,000 sq ft machining and heat treating plant at Newington, Conn. . . . Durez Plastics Div. of Hooker Electro-chemical Co., recently brought into production a new $5 million plant at Kenton, O.

* * *

Du Pont Co. has announced that it will discontinue commercial production of polyethylene film at the end of October. It will continue, however, as a major producer of polyethylene resin.

* * *

Union Carbide Nuclear Co. has been formed as a division of Union Carbide and Carbon Corp. to integrate the parent company's diverse activities in the atomic energy field.

* * *

Public relations firm of Hill & Knowlton, Inc., has acquired Robinson-Hannagan, also a public relations concern. The latter will be operated separately as an affiliate.

* * *

Youngstown Sheet and tube Co. will construct a new battery of 75 coke ovens at its Indiana Harbor Works.

* * *

Bostich, Inc., has broken ground for a new factory and headquarters in East Greenwich, R. I. . . . Brantford Coach & Body, Ltd., will build a new truck equipment factory in Brantford, Ont.

* * *

Marquardt Aircraft Co., Reaction Motors, Inc., and Olin Mathieson Chemical Corp. have established a joint program of applied research to advance supersonic aircraft and missile propulsion.

* * *

Equipment Manufacturing Co. has bought the assets of Metal Fabricating Co. . . . City Auto Stamping Co. has agreed to purchase the business of Globe-Wernicke Co.

* * *

Goodrich-Gulf Chemicals, Inc., will build manufacturing facilities to produce its new man-made rubber. . . . Revere Copper & Brass Co. is planning a $52.7 million aluminum plant at Wenatchee, Wash.

* * *

Edo Corp. is celebrating the 30th anniversary of its founding.

Wright Air Development Center recently tested an all-magnesium jet plane built by East Coast Aeronautics, Inc.

• • •

Vulcan Containers, Inc., is the name of a new organization formed by consolidating Vulcan Stamping and Manufacturing Co. and Vulcan Tin Can Co. . . . Simonds Saw and Steel Co. is now operating the manufacturing plant of Heller Bros. Co. under the name of Heller Tool Co.

• • •

Piasecki Aircraft Corp. has leased three buildings and has agreed to develop an aircraft manufacturing area at International Airport in Philadelphia, Pa.

• • •

Metal & Thermit Corp. will build a $2 million general office, research, and distribution center in Rahway, N. J.

• • •

Johnson Motors Div. of Outboard Marine & Manufacturing Co. has introduced three new horsepower classes into its line of outboard engines.

• • •

Blaw-Knox Co. has offered to buy the assets and business of Continental Foundry & Machine Co. for about $25 million. . . . Norden-Ketay Corp. has purchased all outstanding stock in Frohman Manufacturing Co., Inc.

• • •

Frye Corp. has announced design and production plans for a new 50-passenger transport plane. Intended mainly as a future replacement for the DC-3, it will be powered by four 600-hp Pratt & Whitney Wasp engines.

• • •

Perfection Spring Mfg. Co., has opened a new plant at 3354 North Pulaski Rd., Chicago, Ill. . . . Pittsburgh Plate Glass Co. has placed in production a plant to turn out windshields for non-current automobiles at Greensburg, Pa.

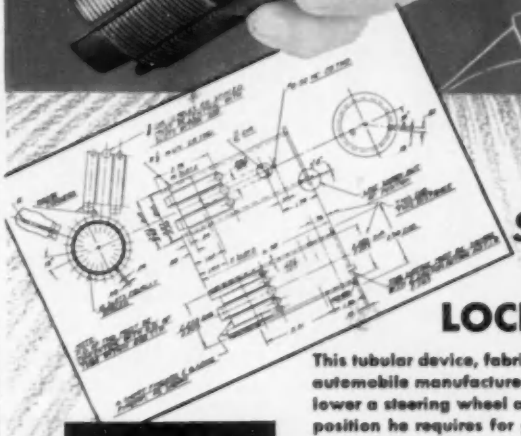
• • •

Directors of both companies have approved a merger of ACF-Brill Motors Co. of Philadelphia and Big Bear Markets of Michigan, Inc.

• • •

Kaiser Aluminum & Chemical Corp. plans expanded production facilities at the Halethorpe, Md., aluminum plant formerly owned by the Government. . . . Stanley Aviation Corp. is planning to double the manufacturing area of its Denver, Colo., plant.

Michigan
Electric Resistance WELDED
STEEL TUBING
Always makes possible Better products at lower Cost



Automotive Steering Wheel
HEIGHT LOCKING DEVICE

This tubular device, fabricated by Michigan for a major automobile manufacturer, enables the driver to raise or lower a steering wheel and lock it into the exact elbow position he requires for greatest driving comfort.

A hand nut on the locking sleeve is turned counter-clockwise one-half and locked at the desired height by a one-half clockwise turn.

The utmost dimensional accuracy is required for this intricate part, which requires a multiplicity of exacting operations for smooth, reliable functioning. It is still another example of the ability of Michigan engineers and production workers to meet the needs of product manufacturers for difficult tubing fabrications produced in volume at low cost.

You are invited to check the dimensions in the drawing at the right. It illustrates the type of problems that our engineering staff is always prepared to solve for Michigan customers.

We will welcome the opportunity to place at your disposal the many years of design and production skills that make Michigan tubular products so superior, so dependable, so economical.

ROUND
SQUARE Gauge RECTANGULAR
Carbon 1010 to 1025

Michigan Tubing
has uniform strength, weight, ductility, I.D. and O.D., wall thickness, machinability, and weldability. It can be flanged, expanded, tapered, swaged, beaded, upset, flattened, forged, spun closed, fluted, and rolled. Available in a wide range of sizes, shapes and wall thicknesses, prefabricated by Michigan or formed and machined in your own plant.

Michigan STEEL TUBE PRODUCTS CO.
Nearly 40 Years in the Business
9450 BUFFALO ST. • DETROIT 12, MICH.
FACTORIES: DETROIT, MICHIGAN • SHELBY, OHIO

DISTRIBUTORS: Steel Sales Corp., Chicago, St. Louis, Milwaukee, Indianapolis and Minneapolis—Miller Steel Co., Inc., Hillside, N. J.—Service Steel Div., Van Pelt Corp., Los Angeles, Calif.—Donald A. Hurston, Cleveland, Ohio—Globe Supply Co., Denver, Colo.—W. A. McMichaels Co., Upper Darby, Pa.—A. J. Fitzgibbons Co., Buffalo, N. Y.—William P. Hall & Associates, Dayton, Ohio

MOTOR FACTS ON INDUSTRY'S
MOST-PREFERRED "POWER PACKAGE."

Electrical System Fact: New fortified insulation includes exclusive Bondar, Bondite and Mylar* for greater protection against the toughest operating conditions.

*Du Pont registered trade-mark

FACT:

The new Life-Line A has stronger insulation than any other motor on the market

Meaning what? Simply that the new Westinghouse Life-Line® "A" motor with new fortified insulation can withstand heavier overloads and operate at higher temperatures than any other motor you can buy.

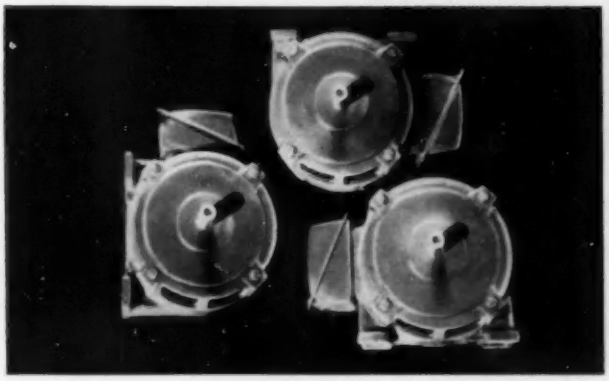
Similar design advances in the mechanical and lubrication systems make Life-Line "A" industry's most preferred motor.

It takes the right combination of *all three systems*—electrical, mechanical and lubrication—to build the best package of power on the market.

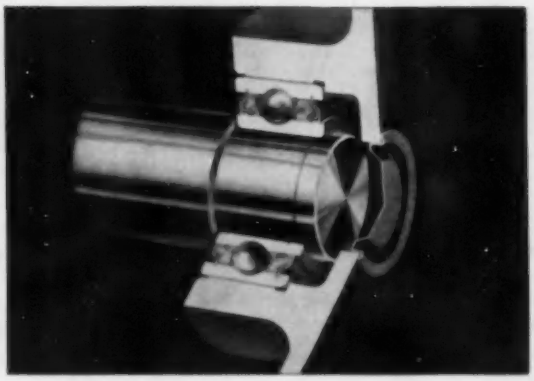
Get all the facts by calling your Westinghouse sales engineer . . . *The Man With The Facts!*

J-21877

YOU CAN BE SURE...IF IT'S Westinghouse



Mechanical System Fact: New cast-iron housing on both drip-proof and totally-enclosed types. Ventilation openings only in end brackets make the motor drip-proof whether mounted on floor, ceiling or wall.



Lubrication System Fact: New "4-way sealed", pre-lubricated bearing eliminates completely the 3 main causes of bearing failure: 1) contamination, 2) over greasing, 3) wrong grease.

Steel Stamping does it BETTER— Ackermann-Wheeling does it BEST!

Engineered Stampings

Hard-pressed manufacturers know that when it is necessary to get production out *fast*...to solve difficult production problems...call Ackermann-Wheeling!

Ackermann-Wheeling means the finest in steel stampings...stampings that give products a definite competitive edge... stampings that often cut costs, allow maximum interchangeability, save machining and drilling operations and improve product appearance.

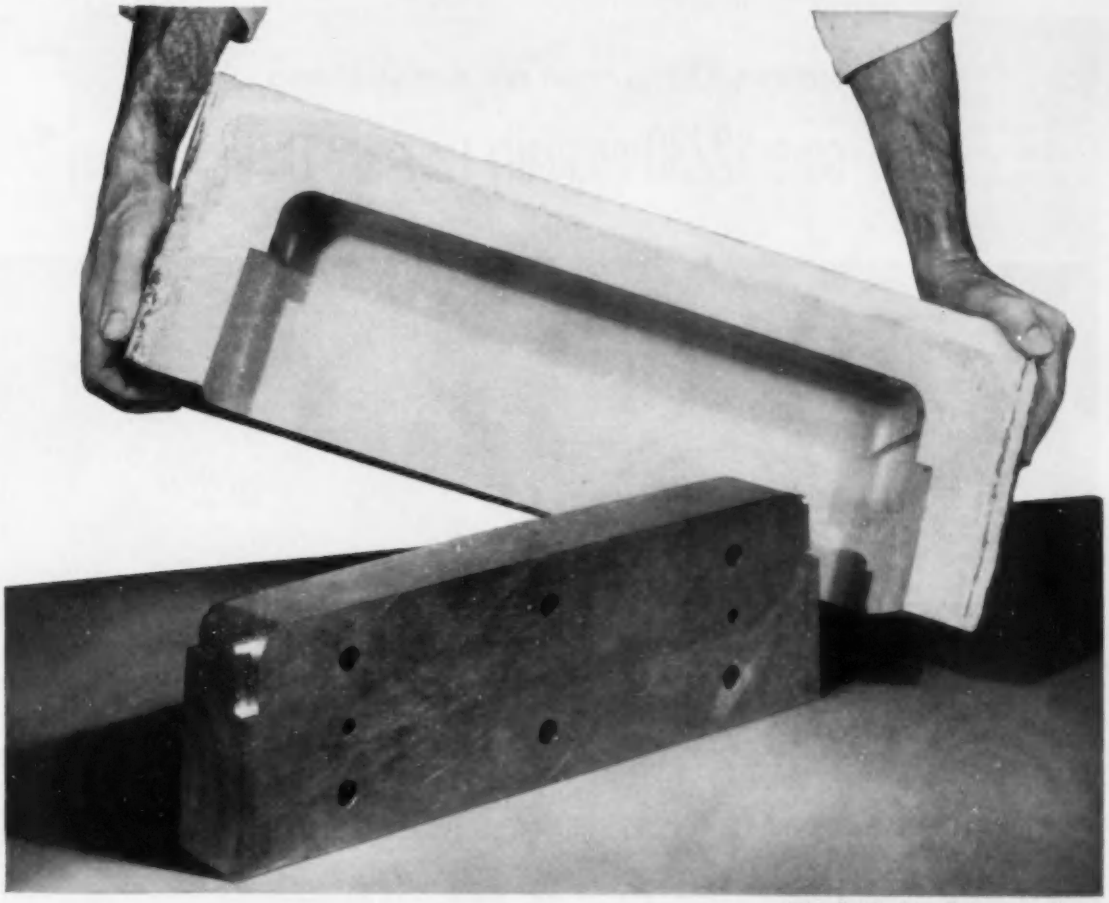
Here you'll find every production facility: deep drawing, shearing, spot welding, arc welding, brazing, pressing, degreasing, painting. All this plus Ackermann-Wheeling vast background of experience.

Got a production stamping problem? Let Ackermann-Wheeling solve it, tool it, mass produce it, assemble it! For full details on our services, write, wire or call!

ACKERMANN MANUFACTURING COMPANY

WHEELING · WEST VIRGINIA

ACKERMANN WHEELING



"Rezolin" Toolplastik Compound forms the concave die model shown here with the machined aluminum model around which it was cast. A "Keller" duplicator will be used to reproduce the plastic model in steel. This method saves five days, with an estimated 25 per cent reduction in production costs. Based on BAKELITE Epoxy Resins, this tooling compound is produced by **Rezolin, Inc., Los Angeles 25, Calif.**

Cast epoxy "Keller" Model shapes up 25% saving

Savings in toolmaking time often reach impressive percentages when compounds based on BAKELITE Brand Epoxy Resins are used. Here are some of the reasons:

- **Liquid compounds—can be cast to shape without pressure**
- **Cured at room temperature—no applied heat**
- **Minimum shrinkage—minimum finishing**
- **Excellent flexural, compression, and impact strength**
- **Outstanding dimensional stability**
- **Light weight means easy handling**
- **Laminated with glass cloth to form jigs, spotting racks, fixtures, and "Keller" models.**

For further information, write Dept. LO-4.

Visit BAKELITE'S exhibit, Booth 1375, National Metal Exposition, Oct. 17-21, Philadelphia Convention Halls, Philadelphia, Pa.

BAKELITE
BRAND
Epoxy Resins for Tooling

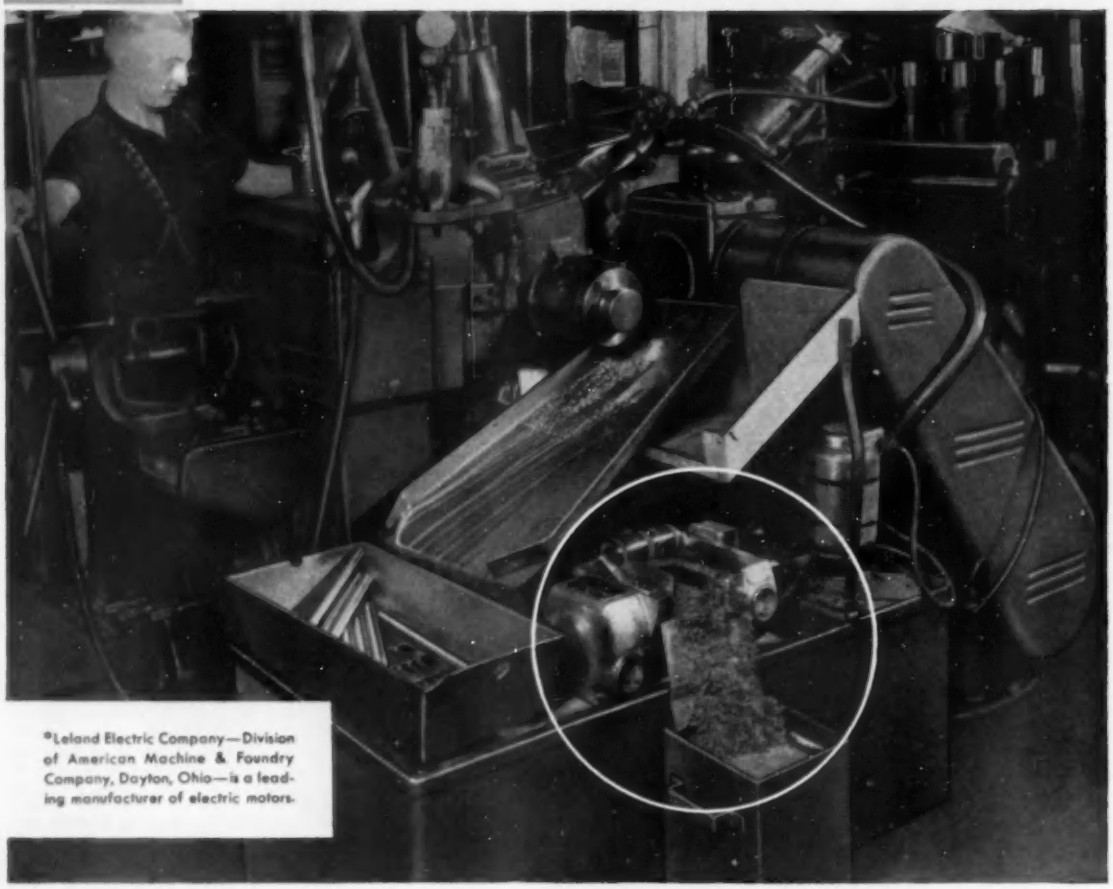
BAKELITE COMPANY, *A Division of Union Carbide and Carbon Corporation* UCC 30 East 42nd Street, New York 17, N.Y.

The term BAKELITE and the Trefoil Symbol are registered trade-marks of UCC

GRINDING MACHINE COOLANT CLARIFICATION

HOUDAILLE MAGNETIC SEPARATORS

save $2230 annually for Leland Electric Company*



*Leland Electric Company—Division of American Machine & Foundry Company, Dayton, Ohio—is a leading manufacturer of electric motors.

● Coolant contamination is no longer a problem in Leland Electric's armature shaft grinding department.

Five Houdaille Magnetic Separators—mounted on grinder sumps—provide machines with a constant supply of clean coolant. Separator shown above removes 62 pounds of metallic chips and sludge daily.

Annual savings in coolant and maintenance costs total $2230. Other benefits include longer wheel life, better product finish, more sanitary working conditions.

The Houdaille Magnetic Separator is designed for complete removal of ferrous metal chips and abrasives. Compact, lightweight, easy to install. Uses no floor space, needs no separate pump and motor. 10, 20, 40 GPM capacities. Write for Equipment Bulletin 601 and 4-page Leland case history.

A SUBSIDIARY OF HOUDAILLE-HERSHEY CORP.

404 Madison Avenue
Lebanon, Indiana

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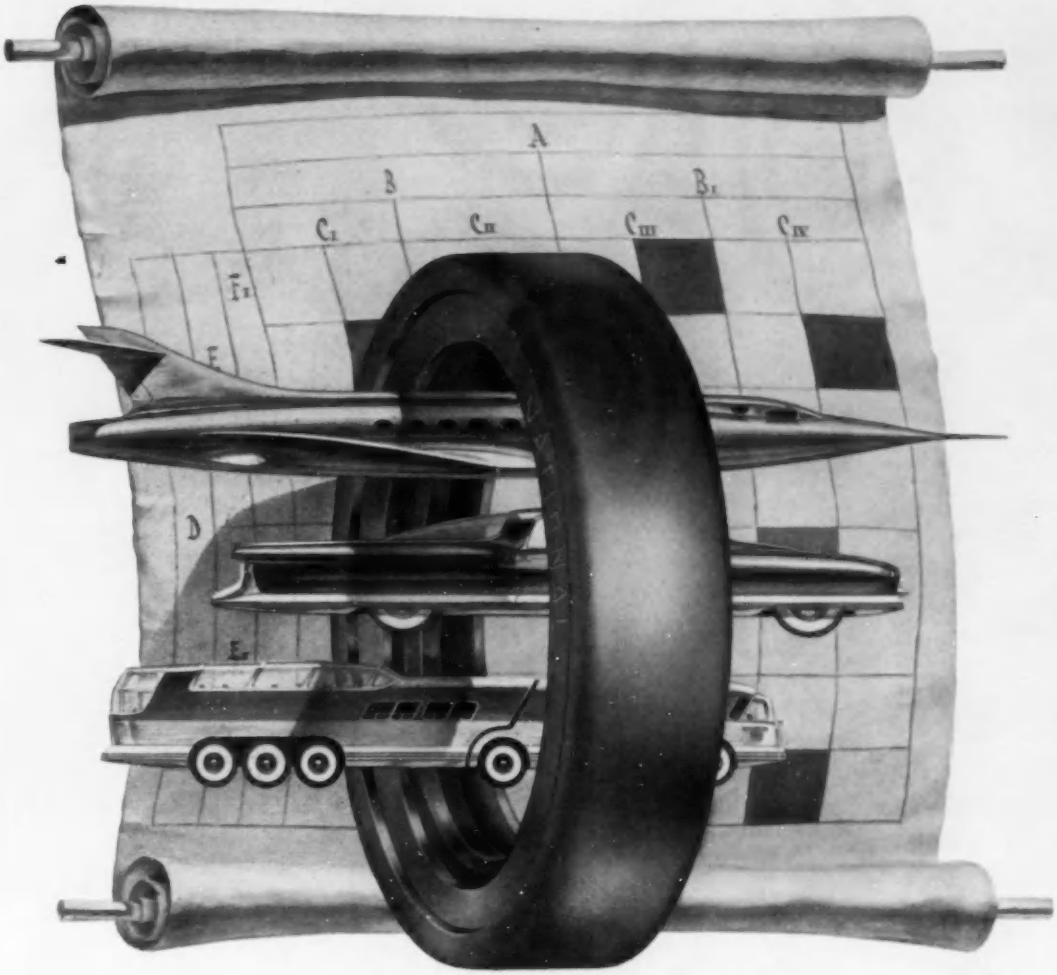
HOUDAILLE-HERSHEY OF INDIANA, INC.
FILTRATION DIVISION



From a strange and ancient 'checkerboard'... tomorrow's oil seals today!

The "Latin Square" is an age-old device mathematicians have used to speed solution of problems having many variables. Now, this same strange "checkerboard" has ultra-modern application in National's oil seal laboratories — where engineers have adapted it to predict accurately the performance of new and visionary sealing lip compounds.

In the hands of National Oil Seal researchers, the Latin Square cuts exploratory engineering time on compounding as much as 75%. Better, more dependable, lower torque oil seals can be available to you months, even years, sooner. It's another example of how pioneering, "years-ahead" engineering at National makes tomorrow's oil seals available today.

National has supplied over a billion oil seals for America's cars, trucks, buses, tractors, aircraft, railway cars, machines and household appliances.

NATIONAL MOTOR BEARING CO., INC.

General Offices: Redwood City, California. Sales Offices: Chicago, Cleveland, Dallas, Detroit, Downey (Los Angeles County), Indianapolis, Milwaukee, Newark, Van Wert, Wichita. Plants: Redwood City, Downey and Long Beach, California; Van Wert, Ohio.

NATIONAL OIL SEALS

D417

You build the right cab for your truck . . .

here's how to get the right heater, too!

Your heater, like the cab for your truck, should be designed and built to meet your own truck requirements.

The heater Evans engineers design and custom-build for you will meet *all* your truck requirements. It will fit *right* – for quick, easy installation. It will deliver all the BTU's needed for maximum driver safety and comfort–under *any* weather conditions.

And because Evans teams a special heavy-duty, continuous-service motor, exclusive one-piece die-cast alloy fan, and sturdy fin and tube type core, the owner gets longer heater service with less maintenance.

Every Evans heater also carries a parts "repair or replace" warranty good for one year or 50,000 miles, whichever occurs first.

Phone or write to have an Evans engineering consultant call on you at no charge. And write now for your free copy of the new Evans Heater Catalog to: Evans Products Company, Dept. P-10, Plymouth, Michigan.

REGIONAL REPRESENTATIVES: Cleveland, Frank A. Chase • Chicago, R. A. Lennox Co., Inc. Detroit, Chas. F. Murray Sales Co. • Allentown, Pa., P. R. Weidner

EVANS HEATERS AND VENTILATORS

Complete truck and bus systems . . . built right for the job!

EVANS

How Holley's rolling laboratories test the fuel metering devices for tomorrow's cars and trucks

When a carburetor prototype or an important design change has proven its merit at Holley's "inside" research lab, it's sent to the world's toughest proving ground—the streets and highways of America.

Holley's inside research and development laboratory—one of the best equipped in the automotive industry—can tell only part of the story. Cold room, dynamometer, and air box testing simulate to a high degree the driving conditions a carburetor prototype will ultimately face. Even before these physical tests, an electronic computer—Holley acquired one of the first in the automotive industry—checks and tabulates design theory from drawing board specifications.

But ultimately, the most conclusive test is found on city streets, country roads and super highways. Holley engineers frequently average 500 miles a day for ten days measuring a carburetor's performance in heavy traffic or on super highways.

The results of this concentration on research both "inside" and "outside" have helped to bring Holley equipped cars 5 sweepstakes champions in Mobilgas Economy Runs and 3 straight Heavy Stock Car winners in the fabulous Pan American Road Race.

HOLLEY Carburetor Co.

FOR MORE THAN HALF A CENTURY —ORIGINAL EQUIPMENT MANUFACTURERS FOR THE AUTOMOTIVE INDUSTRY.

11955 E. NINE MILE ROAD, VAN DYKE, MICHIGAN

1-23

Note to Automotive Manufacturers: This advertisement is one of a series now appearing in dealer publications.

DIRECT MAIL ADVERTISING? ...What's in it for Me?

Much more than you probably realize, Mr. Car Dealer.

Direct mail advertising is your most effective, your most selective selling tool. It makes more sales for you by pre-selecting your most likely prospects for new and used cars, parts and service . . . *and* it *saves* you money, too. It saves you money by reaching, at very low cost, only those people who qualify as your very best prospects.

More than that, direct mail builds a friendly, personal relationship with your present and potential customers. It's the ideal medium for developing your own public relations program, as well as your advertising program.

When you tie in direct mail with your national advertising support, you make *all* of your advertising dollars work more effectively. Your factory's direct mail program has been carefully planned to do a job locally *for you*. Direct mail advertising sells *you* to people who really count – your best local prospects.

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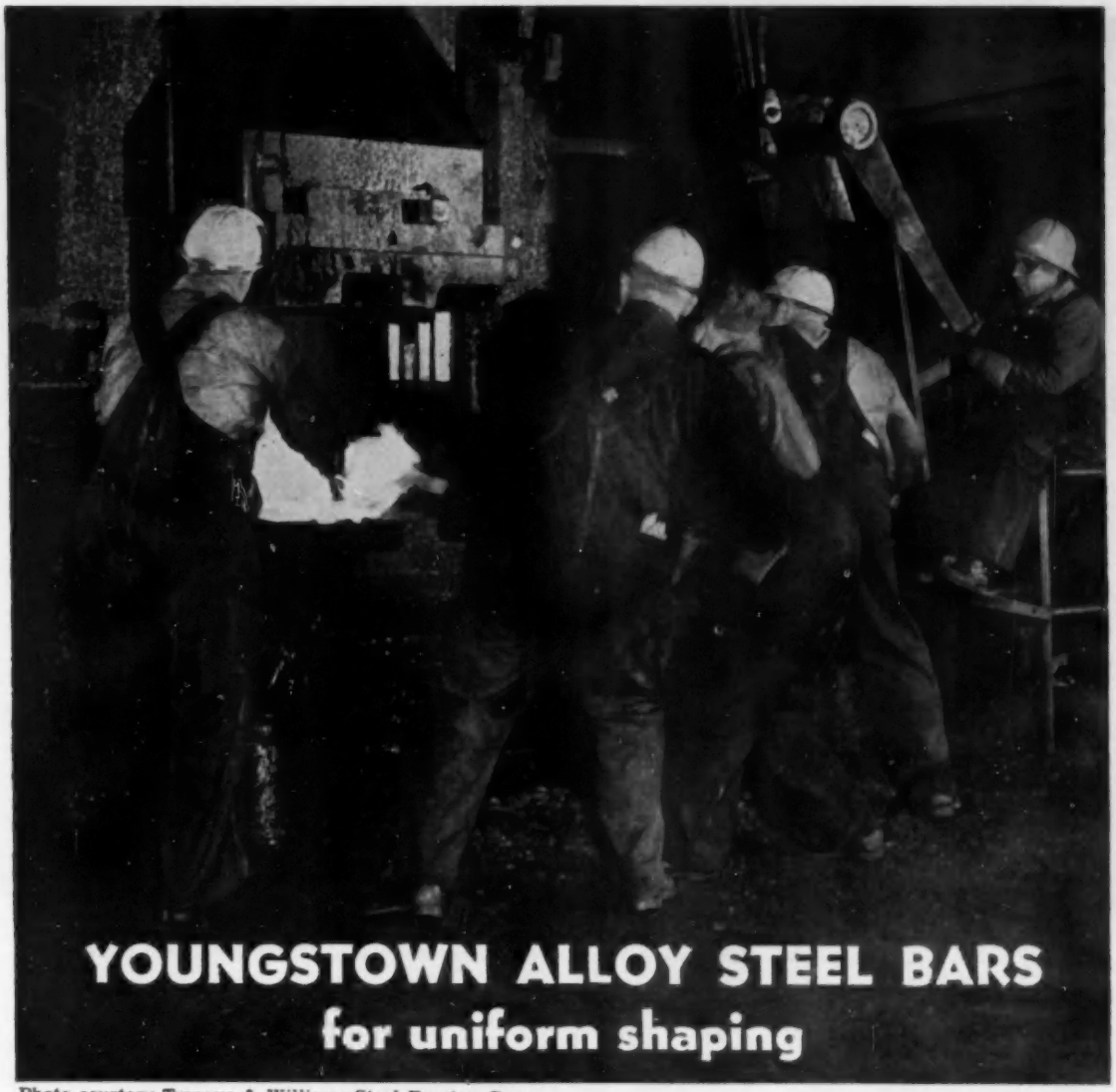


Photo courtesy Transue & Williams Steel Forging Corp.

●Quality control of Youngstown Hot Rolled Alloy Bars insures uniform chemical composition and mechanical properties, as well as uniformity of dimensions. These desirable characteristics result in minimum forging rejects and less loss in flashings.

SPECIFY

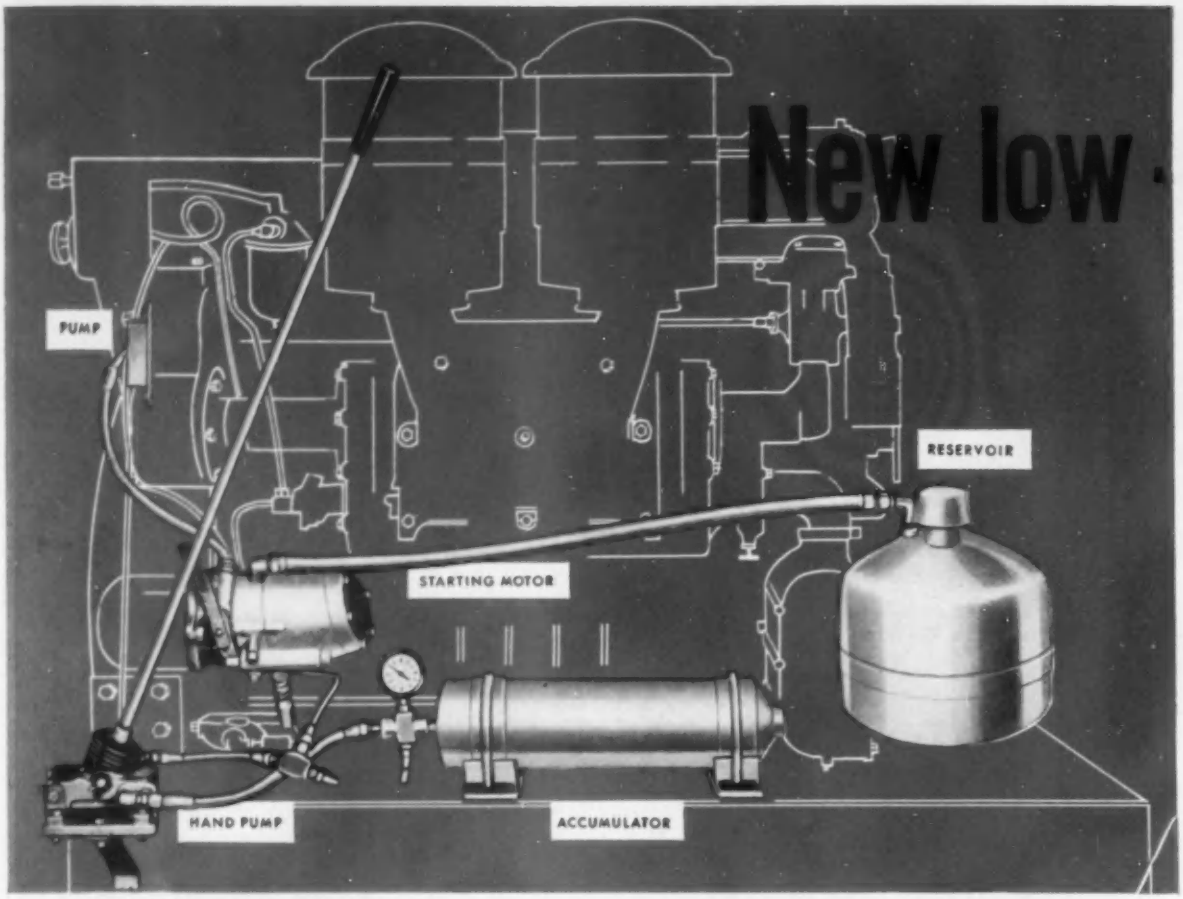
Youngstown

Hot Rolled QUALITY YOUNGSTOWN SERVICE Alloy Bars

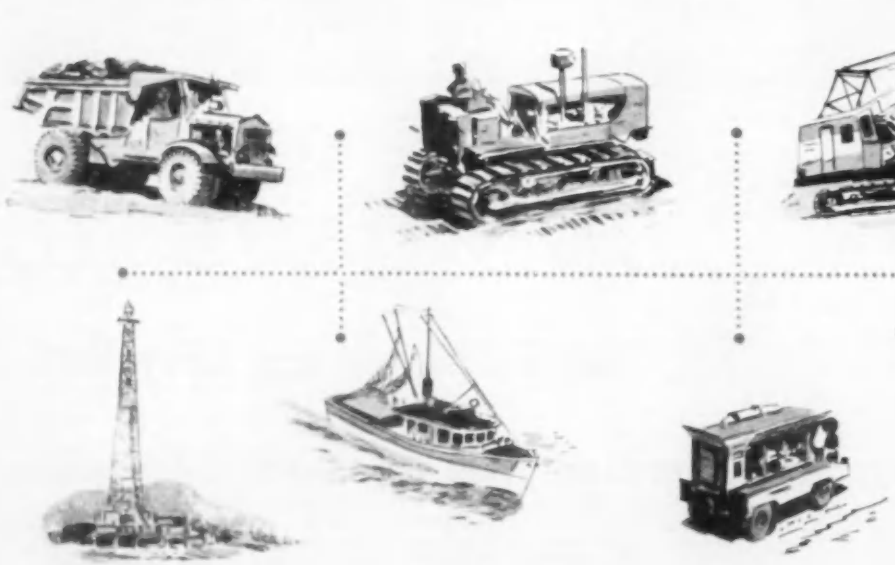
THE YOUNGSTOWN SHEET AND TUBE COMPANY *Manufacturers of Carbon, Alloy and Yoloy Steel*

General Offices: Stambaugh Building - - Youngstown 1, Ohio
Plants: Youngstown, Ohio; Struthers, Ohio; Indiana Harbor, Indiana

SHEETS - STRIP - PLATES - STANDARD PIPE - LINE PIPE - OIL COUNTRY TUBULAR GOODS - CONDUIT AND EMT - MECHANICAL TUBING - COLD FINISHED BARS - HOT ROLLED BARS - BAR SHAPES - WIRE - HOT ROLLED RODS - COKE TIN PLATE - ELECTROLYTIC TIN PLATE - RAILROAD TRACK SPIKES - MINE ROOF BOLTS



NEW Aeroproducts Hydrostarter brings quick, sure, safe starting to Diesel engines in all kinds of weather. It frees Diesel operators from battery replacements, costs less than any other nonelectric Diesel starting system.



General Motors engineering leads the way

· cost Diesel Hydrostarter

For positive all-weather starting

Now you can start your Diesel engine quickly in any kind of weather with the new Aeroproducts Hydrostarter – the hydraulic starting system that replaces regular starters.

It spins a Diesel twice as fast as battery-operated starters, has no parts or components that require regular replacement, costs less to operate than electric starting systems.

It fits any Diesel engine up to 300 horsepower, lasts the life of the engine on which it is installed.

And it sells for a far lower price than any other nonelectric Diesel starter available today.

Easy to install—simple to maintain

Your Diesel engine dealer or equipment distributor can quickly install the Aeroproducts Hydrostarter on your Diesel. The system is so simple that his mechanics—or yours—can do the job with no special training. And all it takes is a few hours' time for installation.

With a Hydrostarter on your Diesel your maintenance costs will drop, too. It's completely self-contained—routine maintenance checks are all the care it needs.

How the Hydrostarter works

Heart of the system is a hydraulic starting motor operated by high-pressure fluid. Pressure is built up and maintained by an engine-driven pump in a piston-type accumulator.

A simple control lever admits this high-pressure fluid to the starting motor, spinning the engine. This control lever also completely engages the starting motor's gears with the Diesel's flywheel before operation.

The hand-operated pump is provided to turn over the Diesel slowly for mechanical adjustments. It also is available to raise pressure if needed. The working fluid is stored and filtered in a reservoir.

See your dealer or write today

If you want quick, sure starts for your Diesels, ask your engine or equipment dealer about the new Aeroproducts Hydrostarter. He can give you full information—or quickly get it for you. If you prefer, fill in the coupon or write direct for more information.

GM GENERAL MOTORS

Building for today... Designing for tomorrow

Aeroproducts

ALLISON DIVISION OF GENERAL MOTORS
DAYTON, OHIO

Please send me full information on the new Hydrostarter.

NAME_____

POSITION_____

COMPANY_____

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MBI

• greater production
• lower costs
• smaller investment

PRECISION DESIGNED AND BUILT TO MEET THE REQUIREMENTS OF THE AGE OF AUTOMATION

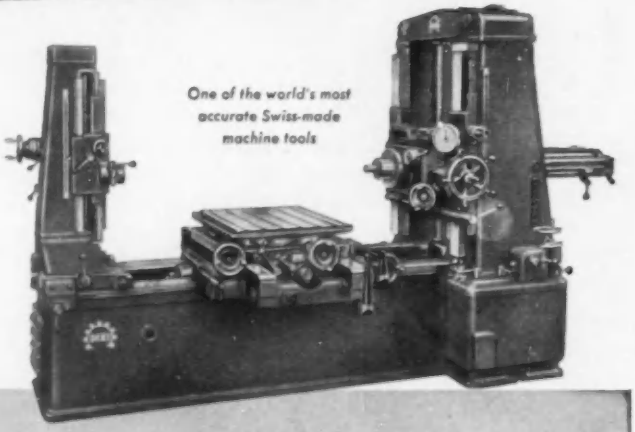
Dixi 60

Horizontal Jig Borer

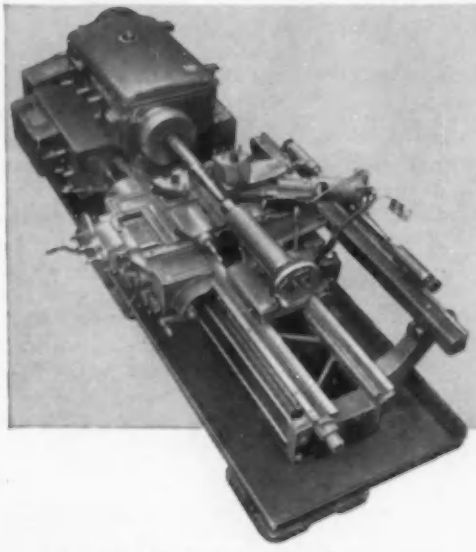
With 5 optical microscopes

A precision machine for boring, drilling, recessing, and milling work. Built-in rotary table with optical microscope can be rotated 360°. Headstock, column, and table settings by optical microscopes to insure overall accuracy of .0002". Table and spindle head have variable hydraulic feed. Mechanical spindle feed can be changed without stopping spindle and is provided with automatic depth stop.

No. 40 taper spindle. Spindle speeds 32-1350 R.P.M. Feeds .0015"—.010" per rev. Table size 28¼" x 32⅝" max. distance spindle to table 19¼". Table travel 23⅝". Spindle travel 24.4".



One of the world's most accurate Swiss-made machine tools



Heavy Duty Lathe *High Precision, Reliability, Top Performance Schaerer Model UN-450*

Twin cross slides. Copies from cylindrical or flat template either longitudinally or cross. Twin slides permit rough turning and finish turning in the same operation in many instances. Swings 17¾" over bed, 9" over carriage, 20-5/64" over gap. Center distance 60". Spindle speeds 31.5 to 1400 R.P.M.

Hydraulic copying attachment can be removed to permit use as a regular twin slide lathe when necessary. 10 H.P. motor drive to spindle. Separate motors for coolant and hydraulic pump. A production lathe built to tool room standards.

- *Guaranteed Service by Trained Staff*
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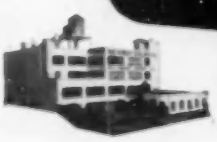


Our Headquarters in New York City

There's magic in the words, "STAINLESS STEEL"

For many years, the man in the street didn't know Stainless Steel from tinplate.

But today, he buys staggering quantities of Stainless Steel tableware, kitchen utensils and gadgets. There's a good chance that his Stainless Steel pots and pans are washed in a Stainless Steel sink. He knows that Stainless Steel is hard and strong, handsome in appearance and corrosion resistant.

Aren't these perfect selling points for Stainless Steel automotive trim? Your dealer can point out that *this* solid trim will not flake or stain. He can mention that Stainless Steel is remarkably strong and will withstand blows that would cause less sturdy materials to cave in.

These aren't the most important features in the world, but they make it easier to sell cars.

There's a USS Stainless Steel type and finish for every need.

UNITED STATES STEEL CORPORATION, PITTSBURGH
AMERICAN STEEL & WIRE DIVISION, CLEVELAND
COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO
NATIONAL TUBE DIVISION, PITTSBURGH
TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA.
UNITED STATES STEEL SUPPLY DIVISION, WAREHOUSE DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

SHEETS · STRIP · PLATES · BARS · BILLETS
PIPE · TUBES · WIRE · SPECIAL SECTIONS

USS STAINLESS STEEL

SEE THE UNITED STATES STEEL HOUR. It's a full-hour TV program presented every other week by United States Steel. Consult your local newspaper for time and station.

USS

UNITED STATES STEEL

It costs less to Start with the Finish

When you begin with Republic Enduro Stainless Steel for trim, the finish is there. You can order it to specifications. Then, all you do is form or fabricate your part, and a buff will usually give you the luster you want.

What's more, that finish is built in. Nothing to chip, flake or peel, because Enduro Stainless Steel is the same all the way through. Enduro resists rust and corrosion. There's little need to scour or polish. Just a soap and water rinse usually restores the luster.

Result: lower manufacturing costs; more eye appeal; more sales features; greater owner satisfaction because the trim outlasts the car.

Republic pioneered the use of stainless steel. Enduro is the result of more than 30 years of making fine stainless steels in many analyses. The type used by Auto Ventshade Co., Chamblee, Ga., for its Ventshades (shown above), happens to be 430. There are many others. And they can be used for making many kinds of brightwork, from window trim to tailpipes.

Our engineers and field metallurgists will be glad to help you pick the right one and then show you how to use it economically. Fill in the coupon and get all the facts.

REPUBLIC STEEL CORPORATION
3106 East 45th Street, Cleveland 27, Ohio

Please send me more information on:

☐ Stainless Steels ☐ Alloy Steels
☐ Sheets ☐ Bolts and Nuts

Name_____ Title_____

Company_____

Address_____

City_____ State_____

K-7001

REPUBLIC STEEL

World's Widest Range of Standard Steels and Steel Products

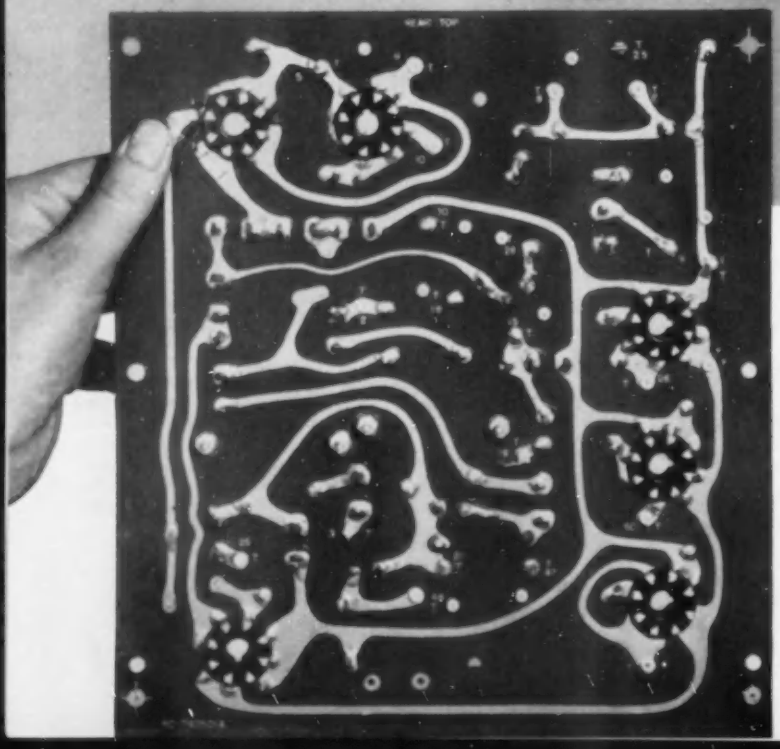
REPUBLIC STEEL

WORLD'S WIDEST STRIP MILL—98 inches—operated by Republic, produces steel wide enough for one-piece auto tops. Republic makes a wide line of flat rolled products including hot and cold rolled sheets and strip, galvanized, galvannealed, chemically treated—zinc plated, and silicon steels and others to meet all requirements.

YOU INCREASE STRENGTH when you design with Republic alloy steels. Here the alloy steel king bolt on the Caterpillar Tractor takes all the pull, bumps and shocks when heavy equipment is dragged over uneven ground. Alloy steel lengthens service life in many automotive parts, including transmissions, bearings, rear axles, propeller shafts. Republic metallurgists will be glad to help you use the right alloy steel.

WHEREVER YOU STOP WRENCHING—these nuts stay tight. They're Republic "Nylok"* Nuts. Nylon plug in the side forces the nut tight against the opposite threads as the nut is turned on. Can be assembled from either end, manually or mechanically fed. Can be locked in any position. This example shows positive adjustment of spring compression.

*U. S. Pat. No. 2,462,603 and No. 2,450,694 and pending applications.



Simpler, more dependable printed circuits (left) eliminate 27 feet of scrambled wiring from these new Weld-O-Timer control panels; heat control (upper left) and weld sequence timer (upper right). By simplifying and improving each panel, printed circuits give a far more dependable control that will require less care than conventional equipment.

Why more welding time here?

First to use printed circuits, the new Westinghouse Weld-O-Timer* takes less care . . . less maintenance

Look at the important pace-setting changes in design, construction, and ease of handling in these new Weld-O-Timer control panels.

Simplified printed circuits eliminate the possibility of human error in hand connecting a jumble of circuit wiring. A new dip-soldering process gives the soundest possible connection between control components and the circuit path. The construction of each control panel is more dependable from the start.

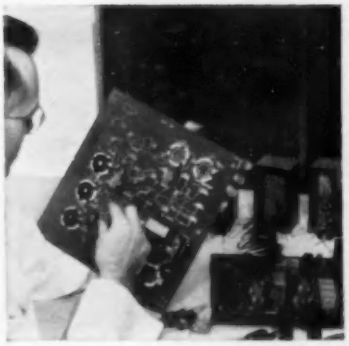
Longer life components are the heavy-duty, industrial type. Simplification of control circuit design reduces the number of components needed by nearly 50%. Cuts replacement costs in half.

*Trade-Mark

30% less weight in the Weld-O-Timer's printed circuit panels makes for easier handling. To further simplify parts replacement, the top side of each printed circuit panel is marked with type and rating data for each component.

You can do more about reducing welding down time and maintenance costs than you ever could before. Start now by calling your Westinghouse sales engineer—*The Man With The Facts*—for complete facts on this outstanding new Weld-O-Timer. Ask, too, for Weld-O-Timer booklet B-6533 . . . or write Westinghouse Electric Corporation, P. O. Box 868, 3 Gateway Center, Pittsburgh 30, Pa. J-21887

YOU CAN BE SURE . . . IF IT'S Westinghouse



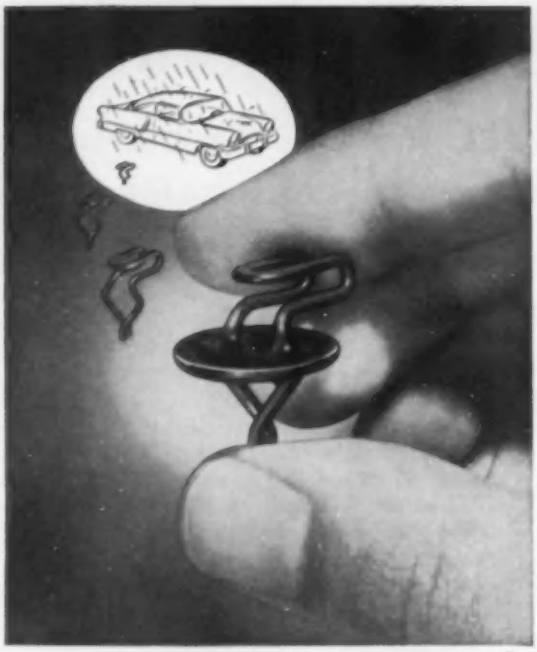
Marked locations for components on each printed circuit panel give type and rating data to make parts assembly and replacement foolproof. Longer life, industrial-type components used on original assembly are recommended for replacement.

Less maintenance time in replacing parts with printed circuits. Can be handled quickly with a soldering iron. Dip-soldered joint on the circuit path is loosened, the component replaced, and a few drops of hot solder restore a tight, sound joint.

Less than a minute is needed to install these lighter weight printed circuit panels. Bayonet-type fasteners secure the panel to the cabinet with a quarter turn of a screw driver. Industrial-type plugs connect panel to Weld-O-Timer circuit.

FROM INDUSTRY'S MOST COMPLETE LINE OF INDUSTRIAL CONTROL

CONTROL COMPONENTS • MOTOR CONTROL • ELECTRONIC CONTROL • CONTROL SYSTEMS NATIONAL SERVICES



chem·o·sol®

solves another problem by improving

DOOR TRIM PANEL CLIPS

The easy molding properties of **chem-o-sol** have enabled one of the "Big Three" to eliminate a costly hand operation — at the same time improving the product.

Problem was to gasket holes to prevent leakage of rain water through clip holes in door trim panels and into upholstery. The conventional hand operation of applying sealant material had proved time-consuming and unsatisfactory. The search for improved techniques showed **chem-o-sol** to be the perfect material — because of its property of ready moldability to the clip, to provide an integral gasketing unit.

This manageable liquid vinyl dispersion was especially formulated for production line application. Easily converted into a tough, flexible solid by controlled heat at moderate temperatures, **chem-o-sol** saved the manufacturer and customer time and money in this low cost molding operation.

Write to us for information on other applications of **chem-o-sol** by dipping, spraying, slush molding, and die wiping. Learn how our individual formulations of **chem-o-sol** have improved other products — created new ones.

Information courtesy of Mattatuck Mfg. Co., Waterbury, Conn.

Send for Bulletin 141.

Chemical Products CORPORATION

KING PHILIP ROAD • EAST PROVIDENCE R. I.

---

use this special, thin GRIPCO JAM NUT

to get a positive lock on bolts subjected to shearing stresses where the strength of a full nut is not required. The thin GRIPCO Jam Nut locks without the use of lock washers or other parts. The nut itself does the WHOLE job—so shorter bolts can be used. Applicable on such products as valve handles, casters, garden and pruning shears, hedge clippers, sickle bars, etc. GRIPCO JAM NUTS are manufactured in the new Unified Finish and Heavy Series (Hexagon). Furnished in standard full and jam dimensions, in steel, brass and aluminum. *Write for samples and full particulars*

GRIPCO PRODUCTS INCLUDE:
Gripco Lock Nuts, New Gripco "Clinch" Nuts, Gripco Hi-Nuts, Gripco Pilot-Projection and Countersunk Weld Nuts with or without Gripco locking feature.

GRIP NUT COMPANY

"after 50 years still holding strong"

311-P S. MICHIGAN AVE., CHICAGO 4, ILL.

NEW USES FOR STRAITS TIN

TIN COATING FOR ALUMINUM ALLOY PISTONS

Today most aluminum alloy pistons for internal combustion engines are given a coating of tin as a lubricant. Interested in new jobs Straits Tin could do for you? Write:

The Malayan Tin Bureau
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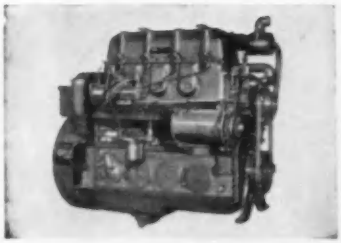
how it kicked some old ideas in the teeth



Series C-18 P&H automotive Diesels — now with *single*, fully self-contained fuel pump; perfect timing and balance for each cylinder. 30 to 280 horsepower, two-cycle, 2, 3, 4, 6-cylinder models, speeds up to 1800 r.p.m. Also stationary, marine and diesel-generating sets.

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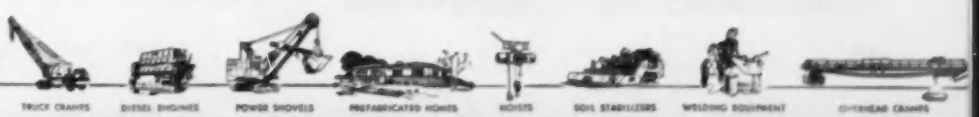
the P&H *Line*



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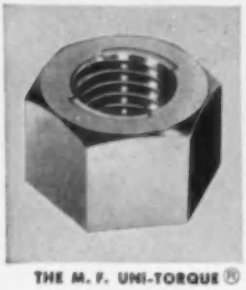
The old hot forged M-F "Unitary" lock nut has become the precision manufactured, cold finished "Uni-Torque" lock nut with a higher torque consistency than ever before thought possible.



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Without the use of plastic, fibre, slots or other complicated locking devices, the MacLean-Fogg Lock Nut Company has succeeded in developing a refined version of the reliable Deflected Thread Type Nut.

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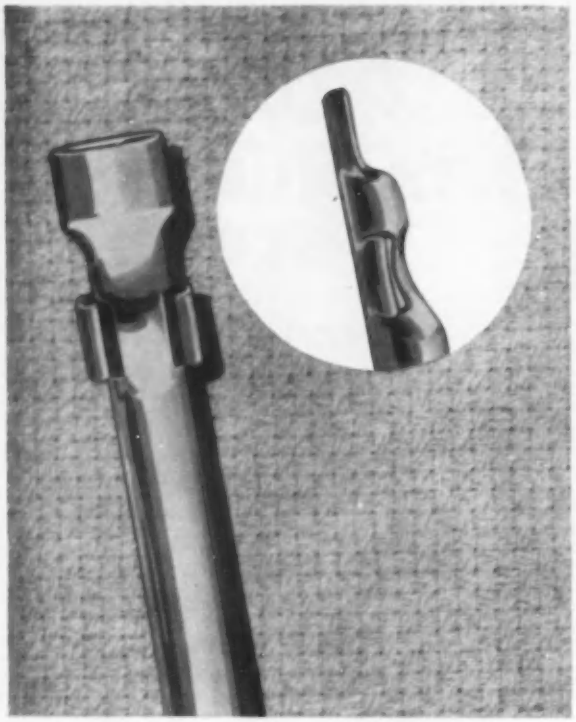
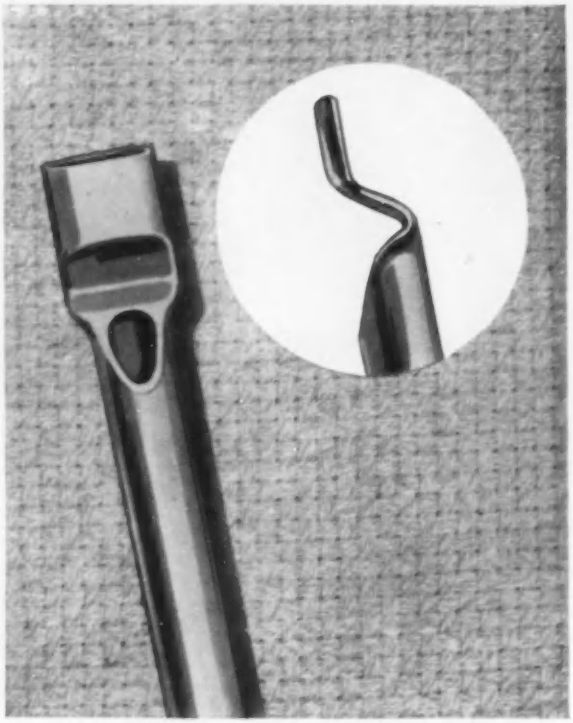
DISSTON HAS THE EDGE®
in special purpose steels
and special steel shapes.

100 YEARS OF FINE STEEL MAKING





It almost goes without saying that leakproof Bundyweld can be depended on for reliable performance. It is axiomatic, too, that Bundyweld takes easily to intricate fabrication steps. Above, left, vent tube for use inside gasoline filler tube presented a problem: how to remove possibility of gasoline entering two side vents as gas tank was filled. New design suggested by Bundy completely protects vent from gasoline entry by baffle deflection; requires two fabrication operations: one to flatten end and pierce tube simultaneously, one to put double bend in flattened part.

Skip the trial-and-error process--change to Bundyweld now!

WHY BUNDYWELD IS BETTER TUBING

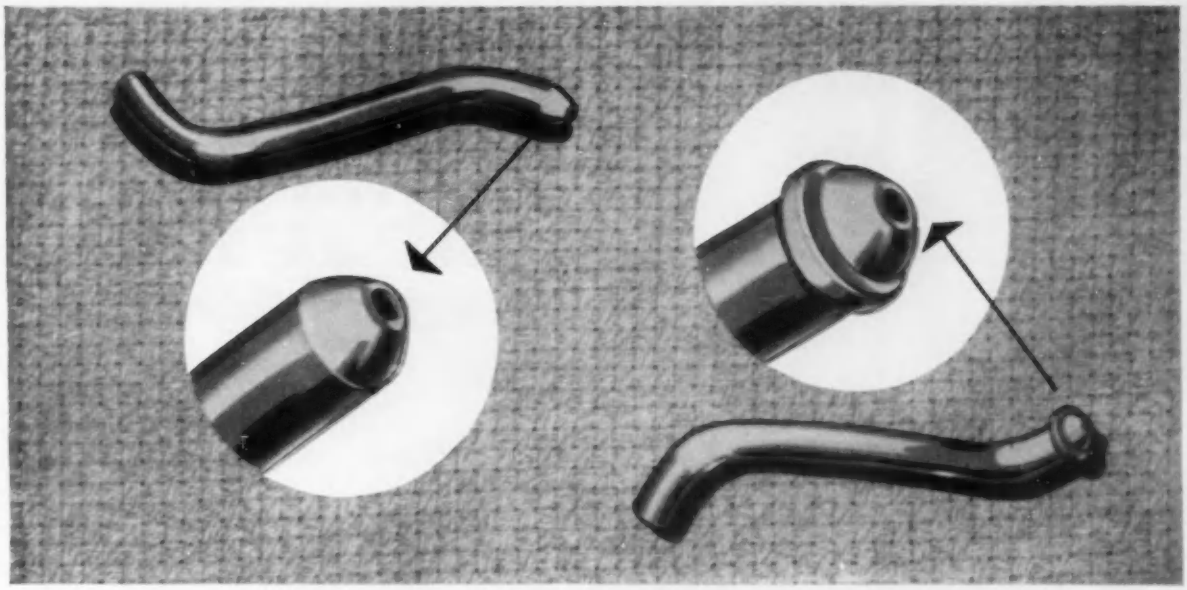
Bundyweld starts as a single strip of copper-coated steel. Then it's . . .

continuously rolled twice around laterally into a tube of uniform thickness, and

passed through a furnace. Copper coating fuses with steel. Result . . .

Bundyweld, double-walled and brazed through 360° of wall contact.

← **NOTE** the exclusive Bundy-developed beveled edges, which afford a smoother joint, absence of bead and less chance for any leakage.



Another example of the ease with which Bundyweld is fabricated: the 3/16" O.D. timing-gear oiler tube shown above required tapered end for a nozzle effect, meant numerous swaging operations. Bundy added upset to nozzle tip (right), incorporated two hand-bending operations into one automatic press operation. Result: impressive fabrication savings.

Maybe you've found a tubing that's somewhat reliable for your automotive brake lines, oil lines, gasoline lines, other tubing needs — *except that it has a mind of its own during fabrication.*

Or perhaps you've dug up a tubing that handles fairly easily — *but you can't count on it for reliable performance.*

You're still looking for the *right* tubing.

We suggest that your search for a reliable, easily fabricated tubing will eventually lead you to Bundyweld. (Reminder: Bundyweld is used in 95% of today's cars in an average of 20 applications each.)

Why not skip the trial-and-error process — wasted time, delivery delays, expensive research, possible damage to your product reputation. Why not measure Bundyweld against your needs *right now.*

Bundyweld is leakproof by test; thinner walled yet stronger; has high thermal conductivity, high bursting strength; takes easily to standard protective coatings; has high fatigue limits. It's the only tubing double-walled from a single metal strip; copper-brazed throughout 360° of double-walled contact.

In addition, Bundy offers you unexcelled fabrication facilities, expert engineering services; custom-packaging of orders; prompt, *on-schedule* deliveries. Whether you fabricate your own parts or want us to do the job, we're equipped to handle your order — *exactly to your satisfaction.*

Why not turn your tubing headaches over to our staff of engineering experts now. They specialize in solving tricky problems, look forward to helping you with yours. Call, write or wire us for information or for help with your problem.

BUNDY TUBING COMPANY, DETROIT, MICHIGAN

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DOUBLE-WALLED FROM A SINGLE STRIP

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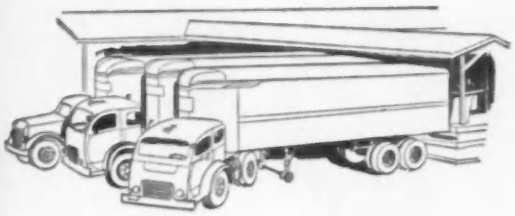
Roy Fruehauf, President, Fruehauf Trailer Company



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Tulsa* Winch
TULSA OKLAHOMA DIVISION OF VICKERS Inc

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JOSEPH P. SPANG JR., ***President***
The Gillette Company

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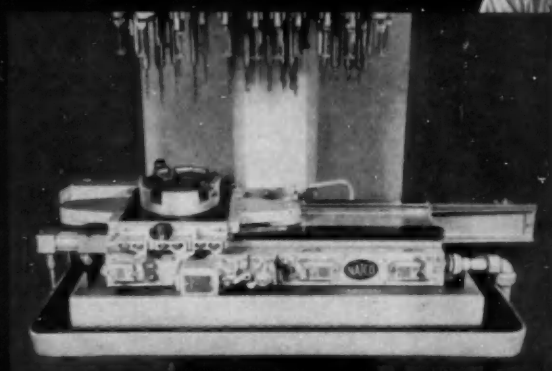
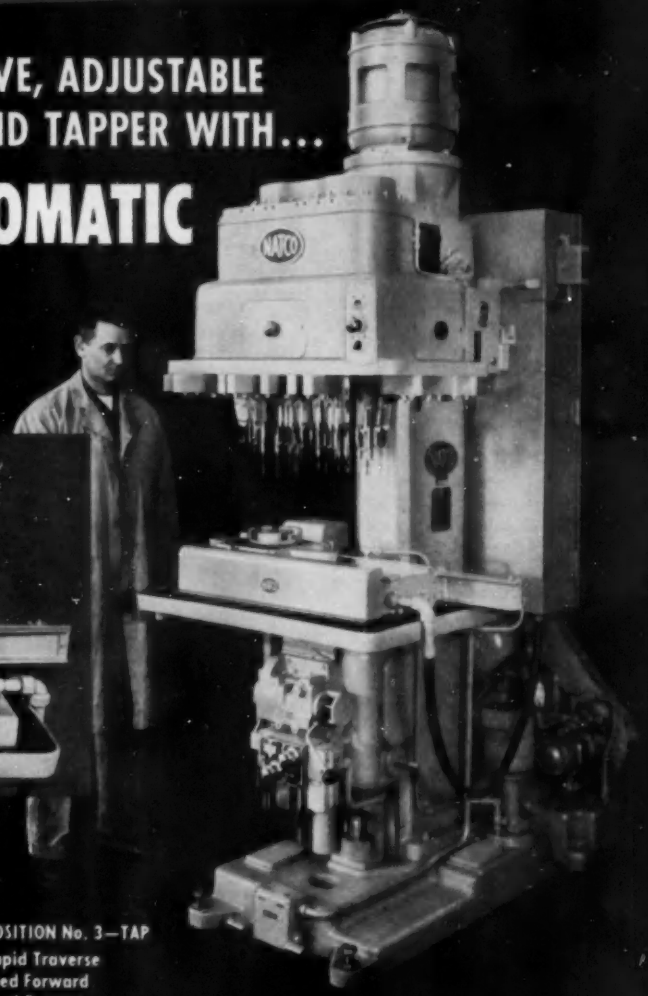


THREE POSITION AUTOMATIC FIXTURE SLIDE IN DRILL POSITION.



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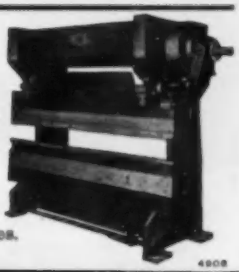
43 Standard Sizes

DIES Punching and Forming for All Makes and Sizes of Press Brakes.



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Gear Production Equipment

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STAMPING DIVISION • 755 East 140th Street • Cleveland 10, Ohio

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"Ni-Resist" Iron Top Ring Section

BOND LOC*

For Extra Heavy Duty Service

PISTONS

STOPS! RING GROOVE WEAR

Double Bonded

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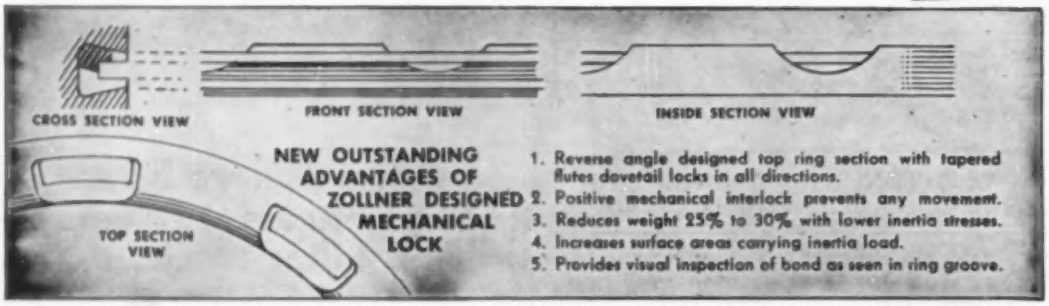
MECHANICALLY Zollner Lock

Up to 5 times more mileage is typical of this great new piston development by Zollner engineers. Designed for the most severe service, the BOND-O-LOC Piston has a "Ni-resist" iron top ring groove section *permanently* incorporated by *both* Al-Fin metallurgic bond and the exclusive Zollner mechanical lock. Separation failure is impossible. Reverse angles on every surface joining the "Ni-resist" iron section provide a multiple dovetail bond which is infinitely wedge-locked. Ring groove wear problems are eliminated, blow-by prevented, oil consumption reduced, mileage between overhauls greatly increased. Many heavy duty engine builders have already tested and approved BOND-O-LOC advantages. Request complete information, now.



NEW OUTSTANDING ADVANTAGES OF ZOLLNER DESIGNED MECHANICAL LOCK

1. Reverse angle designed top ring section with tapered flutes dovetail locks in all directions.
2. Positive mechanical interlock prevents any movement.
3. Reduces weight 25% to 30% with lower inertia stresses.
4. Increases surface areas carrying inertia load.
5. Provides visual inspection of bond as seen in ring groove.

Licensed under Patents 2,396,730; 2,455,457; 2,550,879 * T. M. Reg. Pat. App. For

- ADVANCED ENGINEERING
- PRECISION PRODUCTION

in cooperation with engine builders

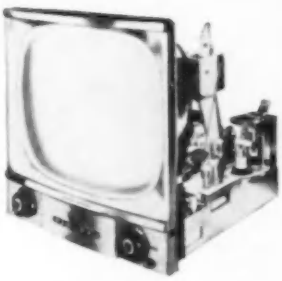
ZOLLNER PISTONS

THE ORIGINAL EQUIPMENT PISTONS

ZOLLNER

ZOLLNER MACHINE WORKS • Fort Wayne, Indiana

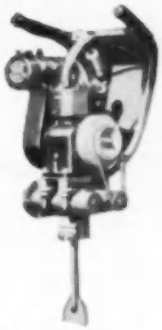
Everlock



Admiral

Placed at strategic spots throughout the chassis, EVERLOCK lockwashers keep Admiral TV sets tight—permanently.

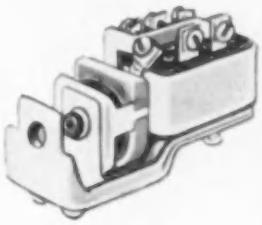
Everlock



MASTER TAMPER

8650 jolts per minute, hour after hour, can't shake loose the EVERLOCK lockwashers on the Master Tamper.

Everlock



R-B-M SWITCHES

Specially designed EVERLOCK lockwashers provide permanent, vibration-proof fastenings on R-B-M automotive foot dimmer, headlamp and horn switches.

Everlock... In the Picture

Lockwashers

Locknuts

Screw-Lockwasher Assembly

Wherever Positive Grip Counts

EVERLOCK lockwashers' exclusive alternating chisel edges bite into the face of the work *and* the nut under powerful spring tension . . . hold fast even under the most severe jars, jolts and vibration. Available in four standard types or to your own specifications, EVERLOCK lockwashers provide the positive holding power demanded by more and more manufacturers of quality products. Next time you order lockwashers be sure to specify AMF EVERLOCK.

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FACTS

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NEW DEPARTURE

BALL BEARINGS

New Departure split inner ring bearings are separable, facilitating cleaning, inspection and assembly into the engine. They carry heavy thrust loads from either direction and will also support major radial loads.

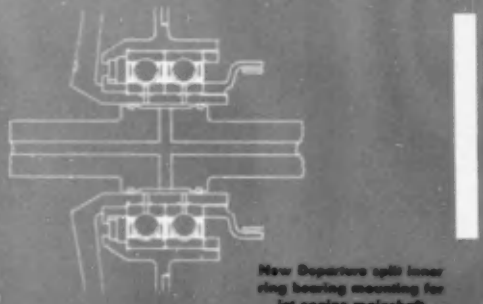
Research develops aircraft bearings for extreme speeds and temperatures

With jet aircraft flying higher and faster than ever before, ball bearings are being called on to meet increasingly severe conditions. For example, bearings that support the turbine wheels are subjected currently to temperatures up to 500° F. at high speeds and heavy thrust loads.

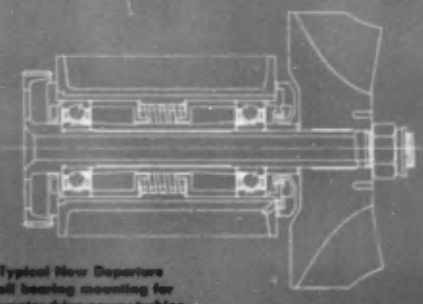
Anticipating still greater demands in the future, New Departure's Aircraft Research Program is already developing bearings for operational speeds of over 100,000 rpm and temperatures moving up towards 1000° F.

Typical of the bearings used in jet engines are New Departure's split inner ring types. These bearings are giving satisfactory performance in production engines today at extremely high speeds and heavy thrust loads. Write for full details.

TYPICAL JET AIRCRAFT APPLICATIONS



New Departure split inner ring bearing mounting for jet engine mainshaft



Typical New Departure ball bearing mounting for alternator drive power turbine

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